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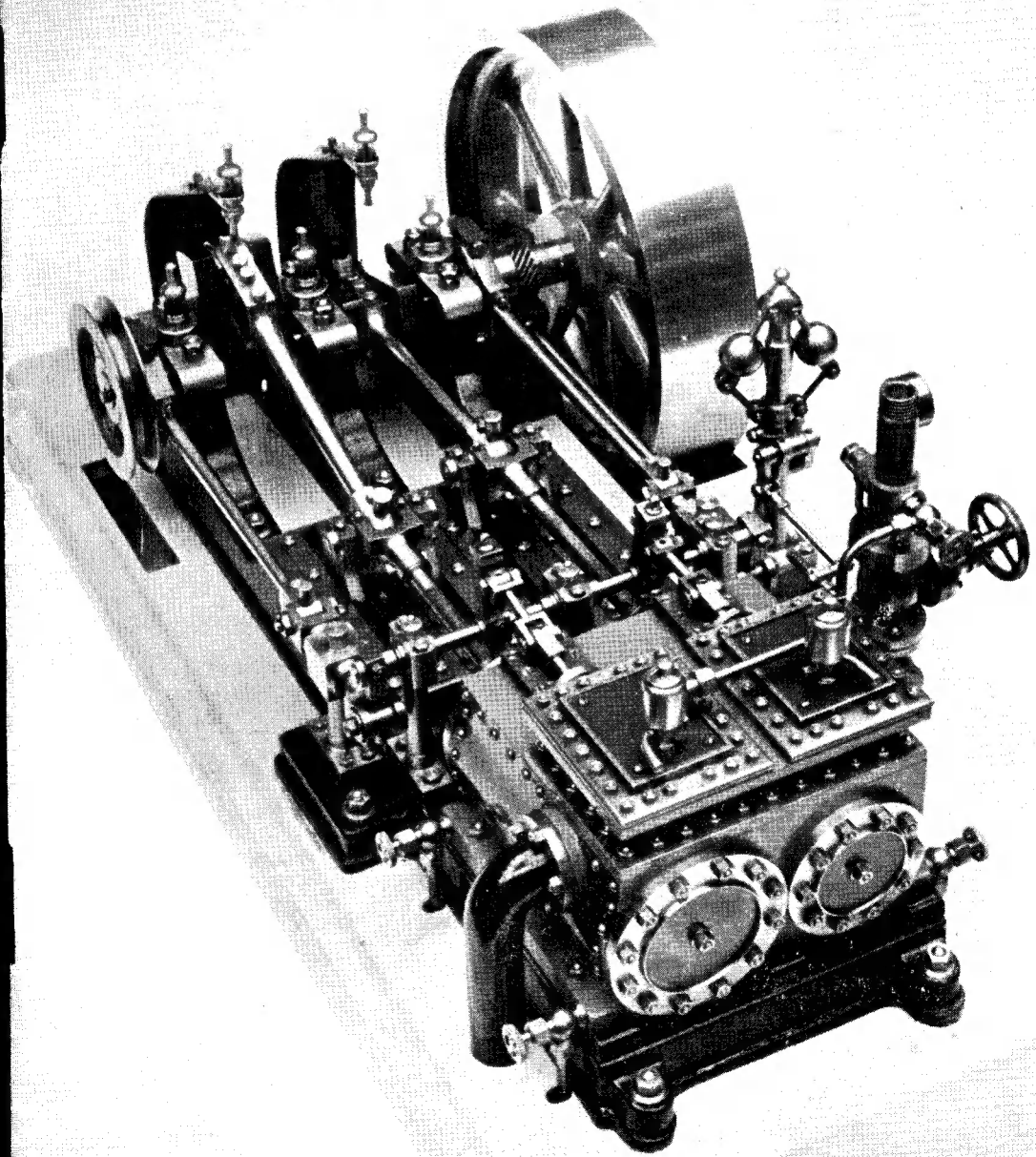
THE MODEL ENGINEER



The MODEL ENGINEER

PERCIVAL MARSHALL & CO. LTD., 23, GREAT QUEEN ST., LONDON, W.C.2

26TH JUNE 1952 VOL. 106 NO. 2666

SMOKE RINGS

Our Cover Picture

● THIS WEEK we present another magnificent model by Mr. H. Booth of Bingley—a horizontal compound factory engine, the original of which was built at Bolton about 1870. It was re-built by a Bradford firm about 1912 after the fly-wheel had collapsed; a fly-wheel of smaller diameter was fitted. It was broken up in 1940 and replaced by electric motors.

The connecting-rods and crank in the original engine were of wrought-iron, but the model shows them after the re-build when they were made of steel. The governors, as shown, are also part of the re-build and replace a set of the Watt type which were fitted to the original.

The original engine was of the condensing type, with the condensing plant as a separate unit driven by a small vertical engine, built by a Chesterfield firm. The air pump was of the Edwards type and of comparatively modern design.

For the benefit of readers in that area, a number of Mr. Booth's fine models were presented to Bingley by Mr. W. H. Smith, and are on view in Bingley.

Model Ship for the Duke

● NINE OF Britain's famous model engineers are working on a detailed waterline model of H.M.S. *Magpie*—a gift from the model engineers of Great Britain to be presented to H.R.H. the Duke of Edinburgh when he opens "The Model Engineer" Exhibition next October.

Each of these model engineers is noted for the craftsmanship of his ship models and is working against time to complete his part of the work on a scale of ⅛ in. to 1 ft.

The work has been divided into the following sections: the hull, super-structure, deck details, guns and other armament, masts and radar array, rigging and W/T aerials, boats and life rafts, paintwork, scenic setting.

The Admiralty is co-operating with the model engineers to ensure that the model will represent H.M.S. *Magpie* as she was under the Duke's command..

"M.E." Exhibition Prizes

● THE EXHIBITION Committee is pleased to announce the following prizes which will be awarded at this year's "M.E." Exhibition:

Our old friend, Wing Commander Lewis, so well known for his keen interest and never-failing help at past "M.E." Exhibitions, has kindly donated a prize of £5 for the best prototype model power boat.

Mr. S. R. Bostel, president of the "Shovel and Pump" Club, has offered a prize of £2 2s. for the best coal-fired, live-steam passenger-hauler of "Emett" type, subject to a satisfactory test on the track.

"M.E." Exhibition Celebrity Stand

● IN ORDER to mark the special occasion of the visit of H.R.H. The Duke of Edinburgh to this year's "M.E." Exhibition, the committee has decided that there shall be a "Celebrity" stand on which to display cup-winning models from former "M.E." Exhibitions. The site for this stand will be on the stairs leading to the dais, immediately below the rostrum for the opening ceremony.

This arrangement will ensure that some of the superb models from past "M.E." exhibitions will be again on view to the public.

Thermolectrics Ltd.

● WE HAVE been requested to call the attention of readers to the change of name and address of one of our regular advertisers. The business formerly known as Thermolectrics Ltd., Chapel Works, Hampton-on-Thames will, from now on, be known as The Technical Services Co., Shrubland Works, Banstead, Surrey.

The specialities include: A bi-metal thermostat, asbestos flexible heating cord, bi-metal strip, silver-tipped contact screws, 1 amp, 250 V, three-heat line cord switches and asbestos slag wool.

"Oldtimer" Wins Again

● THE BERKSHIRE village of Appleford was the scene of unaccustomed stir on Sunday, June 8th, for somewhere about 10,000 people flocked to the place to see the race run by five old road locomotives in a large field at nearby Bridge Farm. Many of the people were enthusiasts who had come from places as far away as Southampton and Northampton; and, of course, there were plenty from London, Reading, Newbury, Oxford, Liecester, Coventry and Birmingham.

Perhaps, the most impressive sight was the stately procession of the five competing engines as they came, in single file, down the road from the farmyard to take up their positions at the starting line. They were led by a half-size traction engine which, in its turn, followed a ½-size miniature. The rear was brought up by a Foden compound steam tractor in excellent condition. The most spectacular member of the procession was Mr. S. J. Wharton's magnificent Burrel Scenic road locomotive, *King George VI*, resplendent in a new coat of crimson paint, with bright yellow wheels, most elaborately lined, and with plenty of polished brass and copper about it.

The racecourse was half-a-mile long from the starting line to the turning point at the far end of the field, and the engines had to run out to the turning point and back to the starting line. It was all over in about five minutes, but most exciting while it lasted. The five engines got away in good style and were soon careering down the field in noisy contest at anything up to 15 m.p.h. After rounding the turning point, what looked like a dead-heat was seen to be developing between Mr. A. Napper's *Oldtimer* and one of the others; but the former won by a good margin.

This is the fourth time in succession that *Oldtimer*, reputed to be at least 50 years old, has won the race, and this year she was running against more competitors than even before. She is a Marshall general-purpose tractor, and her sprightliness bears witness to the soundness of her construction and the care with which she has been maintained. We hope that she and all her competitors will be seen again next year in another friendly contest; in fact, we want to see these altogether delightful gatherings taking place annually for many years to come.

The four competitors of *Oldtimer* were: *Eileen*, owned by Dr. G. Romanes of Bray; *Kim*, belonging to Mr. E. E. Kimble, of Sywell, near Northampton; *Lady Grove*, the property of Mr. M. R. Chetwynd-Slaypleton, of Appleford, and *Pandora*, which belongs to Mr. J. Quick, of Bampton.

King George VI did not take part in the race, but with all its decorative, multi-coloured lights glowing brightly, ran a few demonstration trips after the race.

A New Tool?

● OUR DUMB, spooneristic colleague, whom we have quoted before in these pages, was asked if he had ever seen a "flying saucer." He gazed blankly into space for a moment, and then, his whole expression brightened up as he replied:

"A flying saw, sir? No, I have never seen one; but I believe I once saw a sawing fly, sir."

Wheel-spin at Speed

● WE HAVE received a very large number of letters commenting upon the remarks made by Mr. J. A. Cockroft in his letter published in our issue of June 5th. All of them point out the error implied by Mr. Cockroft's assertion that a stone, hurled at a height of 5ft., would travel at 5 ft. from the ground until its velocity falls. In actual fact, the stone, or any other projected object, begins to fall immediately it is released, tracing a parabolic curve which is longer or shorter, according to the speed of horizontal projection; no part of the curve is *flat*.

As to the causes of wheel-slip, or wheel-spin as it is sometimes called, practically every reader has his own idea, some fallacious, others highly ingenious; but here again, the writers are unanimous in the opinion that the *weight* of a moving body cannot change, *unless* some upward force comes into play. The weight of a moving locomotive, for example, is unaltered at *any* speed; if the locomotive had wings, the story would be different, because an upward pressure of air on the wings would counteract the downward pull of the force of gravity.

We thank the writers of all the letters for the interest they have taken in the matter, but we see no reason to alter the view which we expressed in our note of May 1st; this was that the results of practical tests seem to suggest that a new outlook on the problem will have to be thought out. There is one important factor in the matter, and it is that, in the case of a locomotive or train moving on the track, there is always a side-to-side sliding, or "hunting" of the wheels; if the wheels are driven, this "hunting" must cause a greater or lesser amount of slip between the driven wheels and the track. This effect is due to loss of *friction*, not weight.

"Talking about Steam——"

by W. J. Hughes

A series of articles intended to supply suggestions and information for the would-be "modeller in steam" who has not the time, the inclination or the opportunity for extensive research

6: ★Small and Medium-sized Stationary Engines

WHILE discoursing on the single-cylinder horizontal engines, we might have mentioned the well-known and popular "Tangye's Patent" engine. The illustration (Fig. 21) is from the catalogue of the Vienna Exhibition of 1873, and is by courtesy of Mr. John L. French.

This type of frame or bedplate was popularly known as the "semi-girder," being of box-girder cross-section but supported along its whole length with only the cylinder overhanging. The crankshaft, with overhung disc crank, is supported in a bearing integral with the frame, and a further pedestal outside the flywheel.

An uncommon feature for that period is the marine type of big-end. The guide-bars are cast in one with the frame, and it will be noted that the lower one is sunk in to form an oil-retaining depression. This is because when the engine is running normally "outwards," that is, with the top of the flywheel moving away from the cylinder, all the vertical thrust on the crosshead is downwards, on both the inward and outward strokes of the piston.

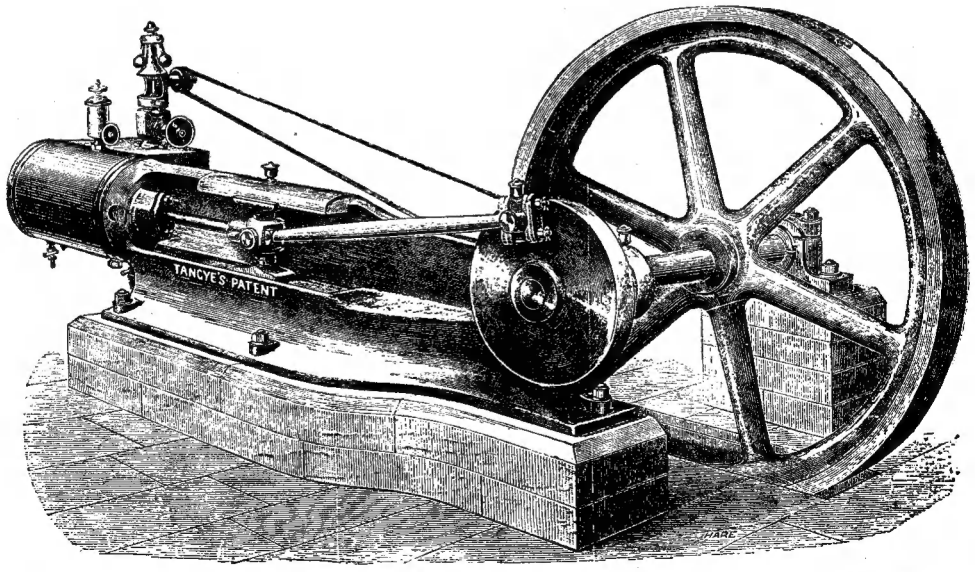
An ordinary single-expansion slide-valve is fitted, driven by an eccentric on the other side of the main bearing from the crank disc, and the Tangye type governor and regulator valve are mounted on top of the valve-chest.

Incidentally, between the wars, commercial castings used to be available from one firm for a model of the Tangye engine, but they do not appear to be on the market at present.

Vertical Engines

There are a good number of designs for vertical engines commercially available, and it is not proposed to devote a great deal of space to the

★*Continued from page* 712, "*M.E.*," *May* 29, 1952.



By courtesy] [*John L. French*

Fig. 21. *Tangye's horizontal engine, as exhibited at the Vienna Exhibition of* 1873. *This neat design, in various horse-powers, was very popular*

more ordinary types of these, therefore. However, I would ask would-be builders of commercial designs to keep in mind the remarks about proportion, number and sizes of studs and nuts, and so forth, made in the last article of this series.

Fig. 22 shows a typical complete installation of the simple vertical, with boiler mounted on the same cast baseplate. The main standard is of particularly neat design, incorporating the pedestals, and would make an interesting variation on the type usually seen in models. It would not be possible to bore the crosshead guide with a boring-bar held between centres, but it *could* be done by means of a stoutish bar held in the chuck. Furthermore, if the base of the pedestal were fixed to an angle-plate secured to the boring-table, or, better still, to the vertical slide, the angle-plate or the slide could next be slewed through 90 deg. to bring the main bearings parallel with the lathe axis. The brasses, held down by their keeps, could then be drilled undersize, and bored out by a slender boring-bar running between centres, which should ensure their being truly square with the trunk-guide.

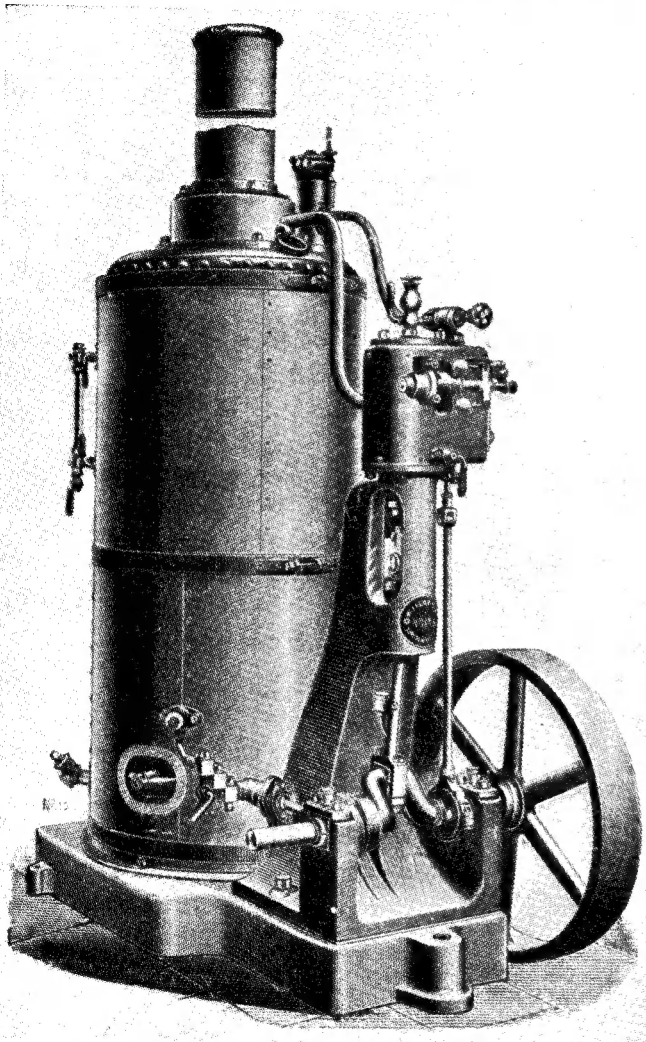


Fig. 22. This 1½ h.p. vertical engine and boiler was built by Foster's in 1895 : the neat engine pedestal is particularly attractive

Reverting to engine-details, it will be seen that the governor is mounted in a cast bracket secured to the cylinder. With its spindle horizontal, drive can be direct from the pulley on the crankshaft. The water-pump is bolted to the main casting, behind the "bent" crankshaft and, is driven by an eccentric between the governor pulleys and the bearing.

Points to note about the boiler include the Salter spring-balance type of safety-valve (which may not reproduce too clearly) and the manhole, a feature which, even if only a dummy, can add greatly to the appearance of a model boiler. Another feature which would add realism is the lifting-ring attached to the boiler top—there would be another at the other side, of course.

It would also help appearance (as well as efficiency!) if the boiler were lagged like the prototype, especially if the lagging sheets were correctly riveted together with really small rivets. (Domestic pins would serve.) In this connection, however, we have already seen in Fig. 11 that not all boilers were lagged ; but with an unlagged boiler *true* realism can only be achieved by making the boiler itself out of separate sheets with plenty of rivets ! The whole shell would preferably be brazed up as well, naturally. It is a fact that in the past many boilers have been constructed with rivets and soft-solder, of course, but personally I should never feel comfortable in the presence of one which had sixty or more pounds on the clock !

Tyros' Corner

In the next article, I hope to deal with two or three designs for vertical engines which are more-or-less out of the ordinary, but would make interesting and unusual models. Meantime, here is the first instalment for tyros, promised recently.

We may assume that even the rawest beginner knows the elementary principles of the piston and cylinder, the slide-valve, and the crank, I think, but a brief explanation of the terms "lap" and "lead" may not be out of place.

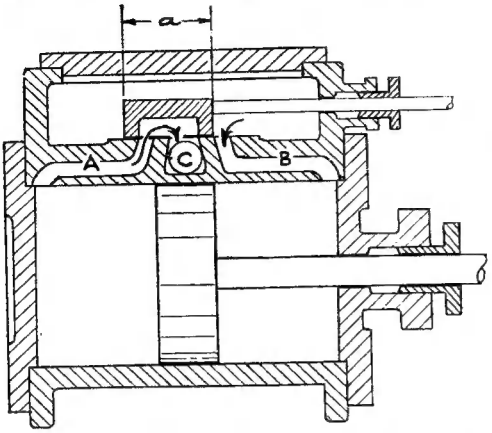


Fig. 23. Cross-section through cylinder and valve-chest, showing simple slide-valve with neither lap nor lead

In Fig. 23, we see that the slide-valve is like an inverted box, which, as it slides to-and-fro on the port-face, alternately admits and exhausts steam from the ends of the cylinder. As shown, steam is being admitted through passage *B* to the right-hand end of the cylinder, thus pushing the piston to the left, and passage *A* is connected with the exhaust pipe *C*, allowing steam which has done its work to escape to atmosphere. At this stage, with the piston moving to the left, the valve is just beginning to move to the right.

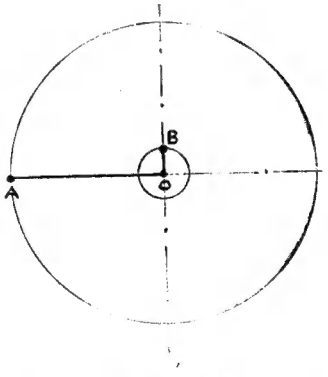


Fig. 24. In this diagram, "AO" represents the crank, and "B" the centre of the eccentric: "OB," the throw of the eccentric, is equal to the width of the steam-port

It will be noticed that the distance *a*, equal to the distance between the outer edges of the two inlet-ports, is also equal to the length of the valve in this diagram. To actuate a valve like this, the eccentric would be placed at right-angles to the crank, with a "throw" or radius *OB* equal to the width of the inlet-port (Fig. 24). Then always when the piston is at either end of the cylinder, the valve will be in the middle of its travel, as in Fig. 25.

In this position, both ports are entirely closed, so that steam can neither enter nor leave the cylinder; but if the valve is moved forward, steam will be admitted behind the piston, which also will move forward.

Continuing the motion, the valve will gradually open the port wider, until the piston arrives at mid-position. The valve now begins to move *backwards*, closing the port. Final closure takes place as the piston reaches the far end of the cylinder, so that to push the piston forward we have used a whole cylinderful of steam.

The next moment, the valve, still moving backwards, begins simultaneously to open the inlet port at the other end of the cylinder, and to exhaust the steam from this end, so that the piston will move back again. This stroke of the piston will use another whole cylinderful of steam, so that one revolution of the crank will use *two* cylindersful.

Expansion

Early slide-valves were made in that way, but it was soon realised that a lot of steam—which meant cost of fuel and water!—was being wasted.

For steam is a highly elastic and *expansive* fluid, and if we can shut it off at say, half piston stroke, the steam in the cylinder will expand, and so propel the piston the rest of the way without using any more steam from the boiler. In theory, at least, we shall save half the coal and water then (though in actual practice the figure will be somewhat less).

During the latter half of the stroke, the steam pressure will fall progressively, as it expands,

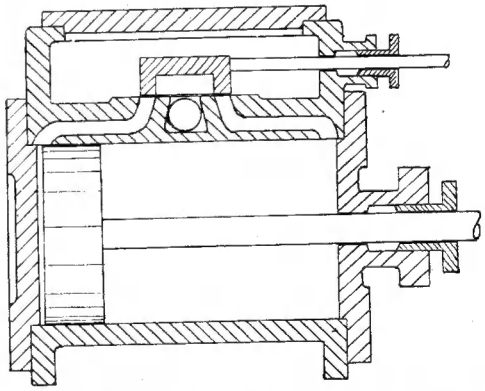


Fig. 25. Position of piston and valve corresponding with those of crank and eccentric in Fig. 24: both ports are entirely closed

of course, which means that we shall not get as much work out of the engine: but this can be adjusted by admitting the steam *at a higher pressure.*

In his book, *The Portable Engine*, W. D. Wans-

brough quotes figures to show theoretically that one engine working at 45 p.s.i., with no cut-off, will use 15 cwt. of coal in a ten-hour day, whereas the same engine, working at 55 lb. and cutting-off at half-stroke, will use only 8 cwt.; moreover, it will do the same work.

Slide-valve Lap

All that is necessary in order to use the steam expansively is to add to the length of the slide-valve, causing it to overlap the steam ports at each end by a definite amount. This amount is called *lap*. (Fig. 26.)

Now in order to open the ports correctly, the valve will have to travel *farther*, and so the radius or throw of the eccentric must be increased

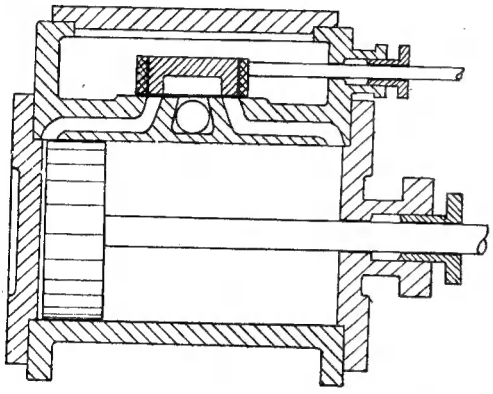


Fig. 26. Slide-valve with "lap" added: the lap is the cross-hatched part added to both ends of the valve

by the amount of the lap. Not only that, but the position of the eccentric must be altered relative to the crank.

Looking at Fig. 26 again, it will be seen that although the piston is at the end of the cylinder, ready to receive steam, the valve will have to be moved forward until it begins to open the port.

This can be done by moving the eccentric round on the crankshaft to an extent sufficient to move the valve forward the width of the lap.

Fig. 27 shows the relative positions of the crank and eccentric necessary to fill these conditions. *AO* represents the crank, and *OB* the radius or throw of the eccentric (equal to the width of the steam port *plus* the lap, don't forget!). If we drop a perpendicular from *B*, the centre of the

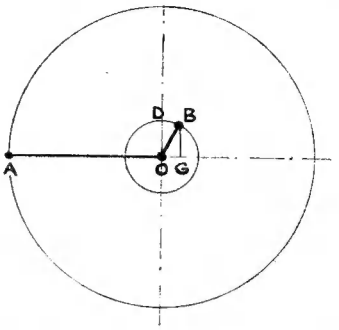


Fig. 27. Position and throw of eccentric adjusted to compensate for lap added to valve: "OB" = width of port plus lap: "OG" = lap

eccentric to *G*, the distance *OG* is equal to the lap. And, finally, the angle *DOB*, by which we have advanced the eccentric, is known as *the angle of advance.*

Even now, we haven't finished playing about with the eccentric, but we *have* nearly finished our space, so must postpone the question of "lead" until the next "Tyros' Corner."

Acknowledgment

Some of the material and diagrams given in the notes above have been adapted, by kind permission of the publishers, from Wansbrough's *The Portable Engine*, first published in 1887, and I am duly grateful to Messrs. The Technical Press Ltd., for this permission.

Many readers will no doubt be glad to know that the second edition of the book, re-titled *The Portable Steam Engine*, is still in print, and may be obtained from that firm at Gloucester Road, Kingston Hill, Surrey. The price is pre-war, too, which makes the volume doubly attractive!

(To be continued)

Road Locomotive at a Carnival

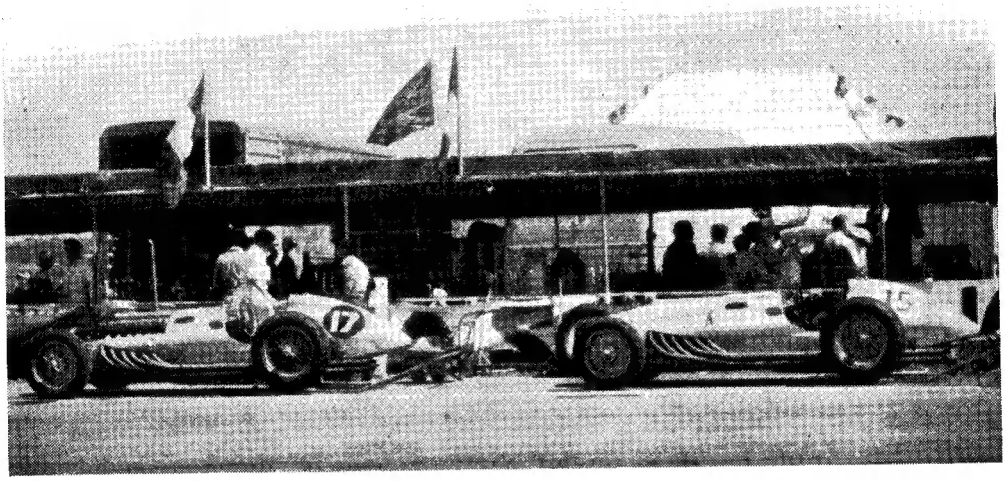
We learn that the fine Burrell showman's road locomotive, *King George VI*, owned by Mr. S. J. Wharton, of Witney, Oxon, was one of the principal features of the Witney Carnival, held on Whit Monday. It took part in the procession and then, we are told, spent the rest of the day being admired by the crowds.

This engine has recently been overhauled and repainted, work which was completed only just in time for the event; therefore, it could hardly fail to be an attraction to many who are not necessarily road locomotive enthusiasts. We are glad to learn that it was awarded a special prize.

MODEL ROAD RACING

An Important Review of a Growing Hobby

by G. W. Arthur-Brand



FIRED by enthusiasm for the "new" form of model car racing which has, since its birth, been referred to and fostered as "Miniature Grand Prix," I have been guilty of supporting a misnomer, and I hasten to correct myself before the knowledgeable have the opportunity to intervene

It is, of course, possible to hold a miniature Grand Prix; but the mere running of Formula 1 cars in miniature upon a model road circuit does not constitute a Grand Prix event. This, no doubt, brings us to the poser—what *is* a Grand Prix event, and how does one arrive at the dividing line? I have an idea that few participants in the new school have stopped to consider this point, and as it has considerable bearing upon the successful establishment of the cult as a sport and hobby, I hasten to supply an answer.

To understand the tremendous significance of Grand Prix racing, we must go back many years, almost to the dawn of the motoring era.

Perhaps a few of our readers (but almost certainly none of those taking part in the "miniature" sport now being developed), will remember the classic French race of that title, held in 1906. This was the heir, as it were, to the earlier Edwardian contests for the Gordon Bennett Trophy events in which teams representing the various nations raced against each other annually. As far as I can ascertain, it was the first occasion on which the term appears to have been applied.

In subsequent years, the Grand Prix became an annual event in France, and rigid rules were laid down to define the types of cars which were eligible to compete. Thus, by amending the rules from year to year, the organisers (*Automobile Club de France*) were able to exert a tremendous influence on the trend in automobile design.

Grand Prix racing, then, was of a nature and status quite apart from all other general competitions. Run under special rules for a definite kind of car built to carefully prepared technical specifications, it attracted the world's finest drivers, who alone possessed the necessary skill and experience to compete. The formula has changed several times since those early days, but the same general principles apply today, and status is still the keyword in any Grand Prix event.

Motor racing in all its various phases is of absorbing interest, and should be well studied and digested by all who intend to participate, even in model form. It is not within the scope of an article in THE MODEL ENGINEER to even begin to cover a subject as vast and as intricate as this; but there are, happily, a number of excellent books on the market, at quite moderate prices, which will help considerably in the attainment of a sound understanding of its technicalities. Should anyone care to write to me, I would be only too pleased to recommend titles suited to the individual's requirements.

The purpose of this article is to give a brief outline of the policy which, to obtain the most satisfactory results, should be adopted by those contemplating the racing of scale model cars. I hasten to add that my suggestions emanate, not from the mere reading of textbooks on the subject, but from actual participation, in an official capacity, in a number of events, including two Grands Prix.

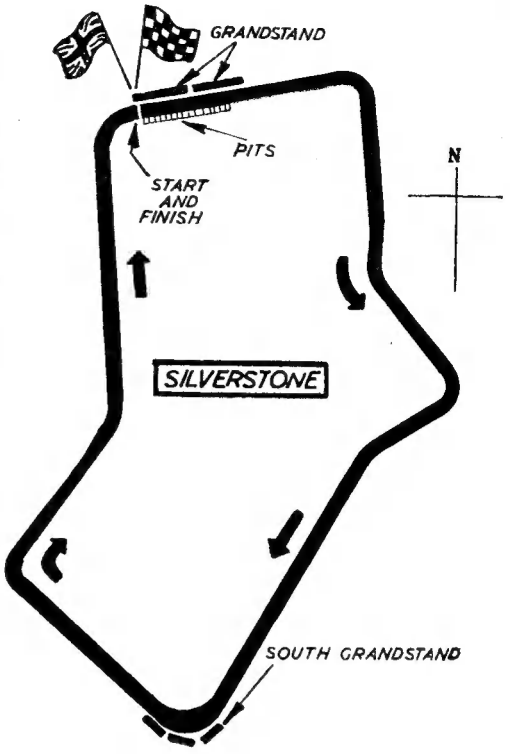
Organisation

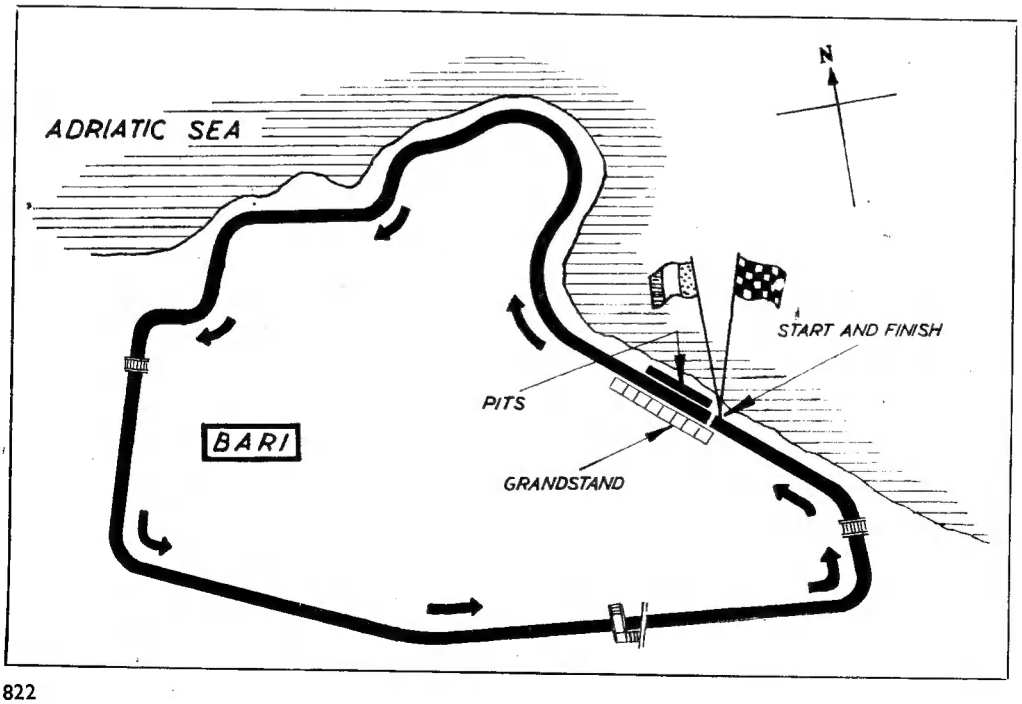
The organisation of a miniature road race should follow closely the procedure dictated by full-size practice, and this brings us to the question of status.

A Grand Prix is an event run under the auspices of the controlling body of the country concerned, in collaboration with the International body, and is of an open nature, that is, open to the entries of both teams and individuals from home and abroad. It is the most important event of the year and, therefore, carries a status of outstanding magnitude.

Whilst it is now possible to hold a number of Grands Prix in any one country in the same year, there can never be two on the same circuit, and, with the exception of the National event (British, French, Italian Grands Prix) they each carry the title of the particular circuit upon which they are run (Grand Prix de Bari, etc.). At the very top of the list is the Grand Prix, D'Europe, which is run in a different country each year, that country being designated by the International body, and the method of selection being more or less rotational.

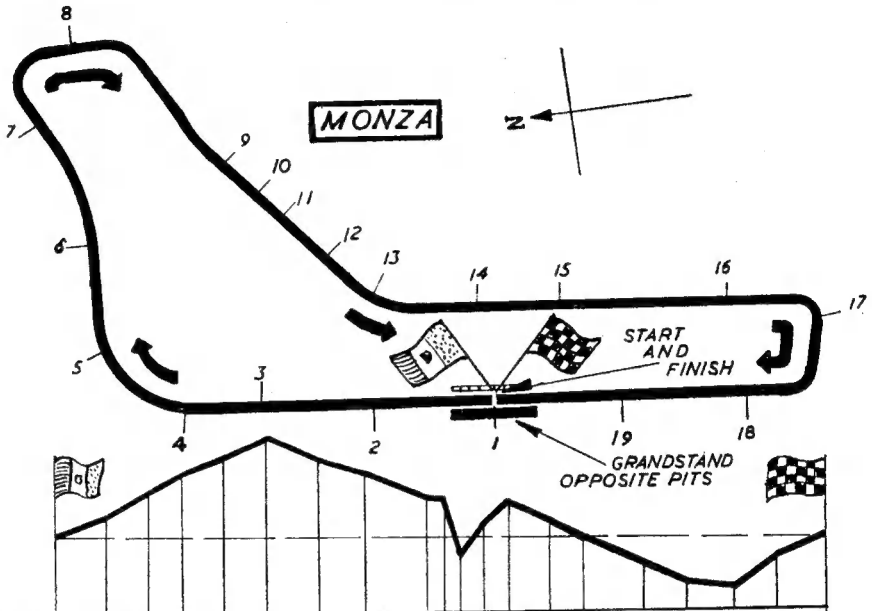
It can thus be seen that by no means all events may bear the much coveted term Grand Prix, but this in no way diminishes the importance of the other meetings which fill the calender each year. It will be to every club's advantage to organise and support as many of these as possible ; however, it will be appreciated that, in order to achieve the desired harmony on the day of the event, and to maintain strict control of the proceedings, a high standard of organisation is of the utmost importance.





Circuits

One of the greatest attractions of model road racing is the possibility of a true scale circuit, enhanced by the addition of all the attendant furnishings such as pits, grandstands, paddock, bridges, lap score boards, straw bales, fencing and bunting. With the accompanying drawings of actual circuits, it is possible to plan such a layout to a nicety, and those who are lucky enough to have available a suitable outdoor site will undoubtedly bear in mind the desirability of a permanent surface and landscaping.



POINTS ON MAP	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	1
DISTANCE IN M. BETWEEN POINTS		400	340	280	320	360	420	380	520	140	99	190	200	350	260	525 70	360	378	388	390
TOTAL DISTANCE FROM START IN M.	0 00	400	740	1020	1340	1700	2120	2500	3020	3160	3259	3449	3649	3999	4259	4784	5144	5522	5910	6300
HEIGHTS ABOVE START IN M	0 00	+1905	+3965	+5355	+6910	+8130	+8518	+5518	+314	+315	−117	+087	+283	+1530	−025	−2085	−3935	−4945	−1830	0 00

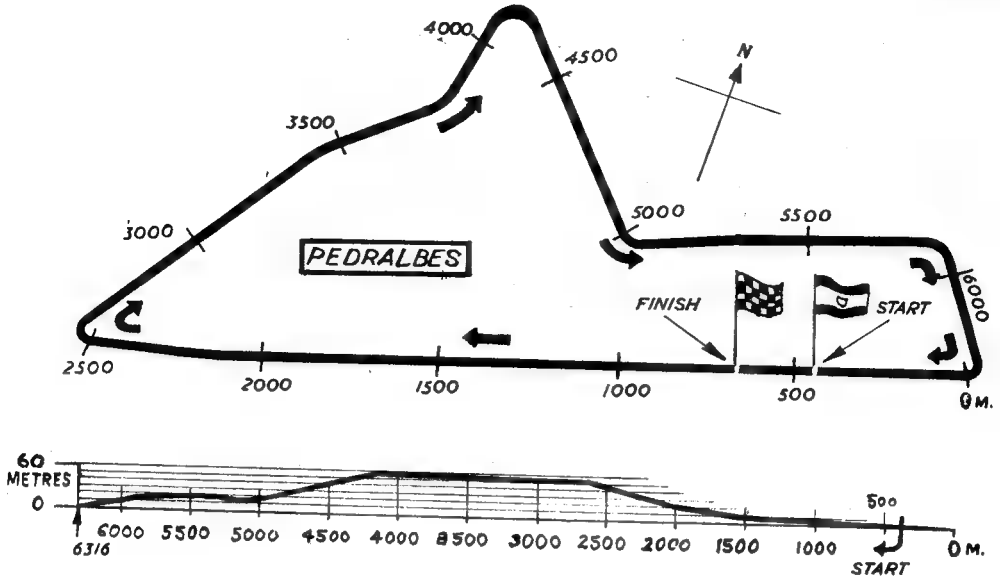
Already one can see a Cooper 500 running side by side with an Alfa Romeo, both fitted with the same engine. Such a state of affairs is misleading to the casual onlooker and quite incorrect, since, by virtue of its relatively smaller size and the distinct advantage gained in power/weight ratio, it will invariably win, or should do, and this is quite obviously contrary to full-size practice. The only real solution, therefore, is to select a cubic capacity for *each* formula (I, II and III), which will allow for the attainment of a performance compatible with scale effect (not necessarily scale speed), bearing in mind, of course, that the present capacity of Formula I ($\frac{1}{2}$ litre supercharged, $4\frac{1}{2}$ litres unsupercharged) is due to change in 1954. From this remark it will be obvious that it is considered an essential rule that the miniature formula keeps pace with that in full-size practice, and that the cars intended for competition be to their correct scale sizes, powered by engines which will ensure a near correct relative performance.

In the case of clubs who are not so fortunately placed, portable circuits can be laid out correct in plan, but the gradients become a problem owing to the awkwardness of storage imposed by trestling. In such circumstances, there will be no alternative but to revert to the level circuit, and an attempt should be made to choose prototypes, such as Goodwood, Silverstone or Boreham, which are, in fact, "flat."

Cars

The problem of powering scale model racing cars is one which requires a great deal of careful thought. It is obviously not sufficient to decide on a plant of a given power and then leave builders to decide for themselves the prototype to which *they* consider it should be fitted.

Among those currently participating, 1.5 c.c. has been accepted as the maximum capacity, although, apart from my own suggestions in past issues, no effort appears to have been made to apply that rating to any particular formula. The "M.E." Alfa Romeo (a model of a Formula I car) carries an engine of that capacity, and from observations to date, it would appear that not



only is the available power ample, but rather inclined to be excessive in the interests of realism. It should be borne in mind by all concerned, that no longer is the object one of attaining fantastic speeds for their own sakes, but of successfully racing one car against another of like formula. With this end in view, it is not only desirable, but imperative that a governing body be formed at an early date to dispense a set of working rules which can be applied on an international basis. In this connection, I should be pleased to act as temporary co-ordinator, and if model road racing enthusiasts will write to me expressing a desire to co-operate, I will make it my business to arrange a meeting at a time and place most convenient to the majority.

The Salisbury Exhibition

The Whitsun exhibition of the Salisbury and District Model Engineer Society was a great success, some 5,000 visitors attending during the two days it was open.

The centre of attraction was the miniature Grand Prix car track loaned by Mr. Adams, of Boscombe, and operated by him and members of the Bath Mini-car Club. The track has now been acquired for the Salisbury Society by a local enthusiast; there are already a number of keen members ready to take up G.P. racing and it is hoped to attract many more.

Over 200 models were on show at the exhibition, oaned by societies in the Southern Federation of Model Engineers, the Trowbridge Society, and unattached model engineers. Mr. John Coulson, of the B.B.C., gave a broadcast description of it on Whit Sunday.

The passenger-carrying railways—Mr. C. Barnett's 7¼-in. gauge "Royal Scot" on Saturday, and Mr. J. Perrier's 3½-in. gauge Gresley Pacific on Whit Monday—were popular.

Exhibits of particular interest were Mr. G. Lovell's 120 ft. "O" gauge steam railway; Mr. Perrier's partly-built 1 in. scale S.A.R. 15F 4-8-2 locomotive; Mr. McDine's delicate model of the Kon Tiki raft; Mr. Trevett's fascinating Cornish beam engine which was running on compressed air at intervals; a nice selection of road locomotives from Mr. Wicks, Mr. Smith and Mr. Smallbones, and showman's box truck by Mr. Howell; Mr. G. Collins' magnificent air-sea rescue launch; and an articulated "Shay" locomotive exhibited by Mr. Neilson, of the American Consulate, Southampton.

Mr. T. A. Bedford's sailing ships were a centre of interest, as was a "Tich" and other models from Lymington, and a fine selection of exhibits from Trowbridge.

Several quires of paper were used on the harmonograph, described by the B.B.C. as a "doodling machine" and the most useless (and most fascinating) object in the exhibition. It drew great crowds, as did Mr. Lovell's Wimshurst machine, with its dancing, elderberry-pith dolls.

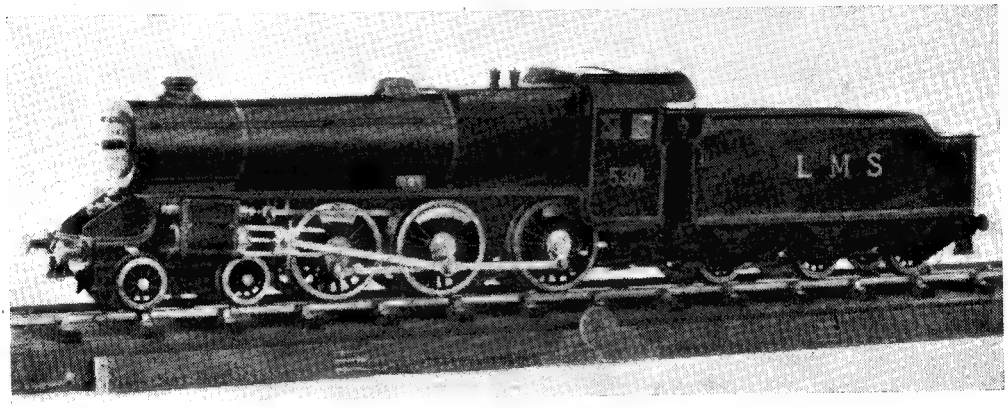
Of unusual interest was a display of violin making exhibited by Col. C. T. Hughes; other stands were devoted to woodwork by Mr. Briggs and schoolboys; model aircraft building by junior members of the society, and a number of models working on compressed air. The Army (R.E.M.E. and Apprentices) stand with its ever-running tap was an attractive item, and two or three trade stands complated a very representative exhibition.

"L.B.S.C.'s" Lobby Chat

The Smaller Fry

EVERY so-often I receive what might metaphorically be called "illuminated addresses in railroad Esperanto," on account of my apparent neglect of the requirements of followers of these notes who specialise in gauge "1" and gauge "O" locomotives. One rather vehement writer said that maybe I had forgotten their existence altogether; and in his opinion, it was about time that I took up some popular type of modern locomotive, and described how to build a gauge "1" version, in the same full detail as *Tich*. He added—and with this I fully agree—that there are would-be builders whose trackage space, equipment, and last-but-not-least, financial resources, won't permit of their building a 3½ in. gauge *Britannia*; but they are none the less as enthusiastic as their more fortunate brethren. Well, I guess it is a hard job to try to please everybody; the person who has succeeded in doing that, hasn't yet been born, and I doubt if he (or she) ever will be! The trouble is, as far as little locomotives are concerned, that every builder puts his own desires first, and—as is only natural—is firmly convinced that there are many others whose opinions and requirements are similar, which is not always the case.

As regards the trend of these notes, I go principally by my huge correspondence; and the locomotives described, also the general "'ints and tipses," are in accordance with the wishes of the majority. However, it is hardly fair to say that I have completely neglected the smaller fry; and in several instances, I have given a half-size version of a fully-described 3½-in. gauge job, suitable for gauge "1," and a half-size 2½-in. gauger to run on gauge "O." Incidentally the first locomotive that I ever described in full detail, in these notes, a quarter-century or so ago (doesn't the time fly!) was a gauge "1" American-type Pacific. I would point out to all builders of the smaller sizes of locomotives, that the fully-detailed instructions given for machining and fitting the larger sizes, are equally applicable. Boilers of the regular locomotive type, with internal fireboxes and tubes, are also made in the same manner, using the same "technique,"



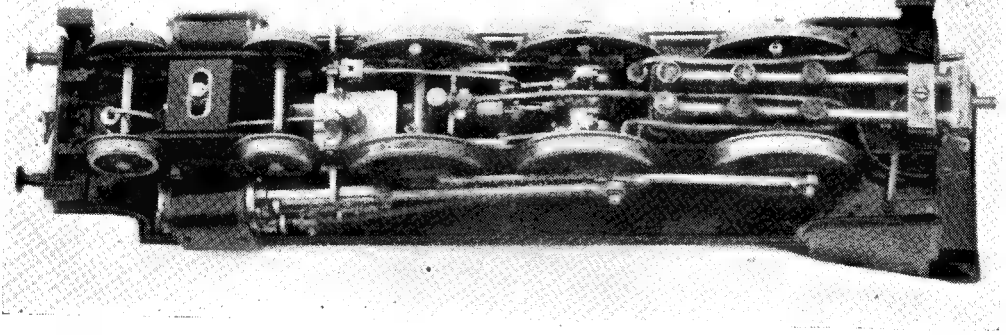
Mr. S. Reeves's "Wee Dot like Doris"

as the bigger ones; but in gauges "1" and "O" it is usually more convenient to use a water-tube boiler, fired by oil or spirit, as these small engines are principally used for hauling trains of goods or passenger rolling-stock on what I call "scenic" railways. The driver does not ride with them, as in the larger gauges, and the principal requirement is for the engine to pull its load, for as long as possible, without attention. For example, in days gone by, I had an old correspondent who was a schoolmaster. He had a gauge "1" line, affording a continuous run, laid around a cellar; and owned several spirit-fired locomotives and a considerable amount of rolling-stock. When he first wrote to me, he complained of only obtaining short runs with light loads, though he had purchased high-priced commercial jobs, and had two engines made specially (at a cost!!) by a well-known professional "model-maker." Just to show what *was* possible, I took one of the engines in hand, and altered the cylinders and motion to suit the principles laid down in these notes. She had a water-tube boiler, fired by a six-wick "poison-gas plant"—the very appropriate nickname for our old friend "Mr. Meth." The only alteration I made to the boiler, was to line the casing with $\frac{1}{16}$ in. asbestos millboard, partly to reduce the cavernous space between the inside barrel and the casing, and partly to keep the heat

in—and incidentally the paint on the outside! I made a new spirit lamp with four burners only, in the form of a square, as the firebox casing was of the wide pattern.

Some Difference!

The owner's favourite method of operation was to fill the boiler three-parts full, and fill the spirit-tank in the tender; his engines had no pumps, and the spirit feed to the lamp was by open sump and drip feed, regulated by a screw-down valve on the pipe. He got up steam by "natural draught," with the push-in front of the smokebox removed. When working pressure was reached, he would start the engine off with a train, note the "time of departure," then sit down and smoke his pipe, until the water was all used up, and the engine stopped with a dry boiler. It came to no harm, as the spirit flames couldn't burn up a brazed or silver-soldered inner barrel; and as soon as the blast stopped, the burners choked and went out through want of air. I wonder the awful smell and fumes didn't poison the old boy! When sending the engine, he said it was the best of the lot, and could pull five coaches (the usual commercial tinplate variety) for 16 minutes, with the six burners going strong. When he got it back, and found only four burners, he was flabbergasted, and wrote querying it, asking if the engine would still pull the five coaches with two burners short. When he received my reply, he nearly fainted on the spot, for I told him to put all the coaches he had behind the tender (sixteen in all) and not to have the wicks too high, or she would blow off, waste the spirit, and he wouldn't get his long nonstop run!



"The little bits that matter"

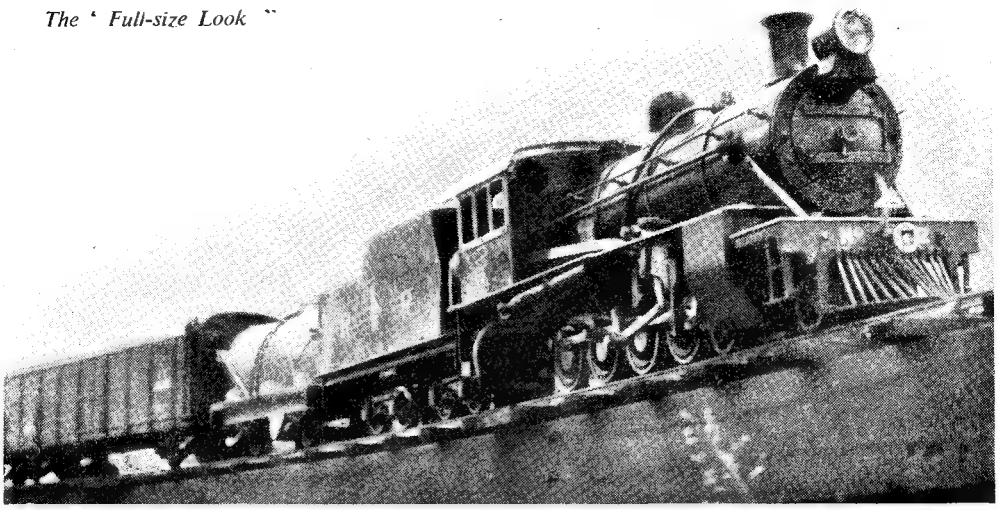
Shocking!

I knew, of course, what she would do, as I had tested her pulling my own weight, on my old straight line at Norbury, where I was living at the time; after twelve stone of "live meat," sixteen tin coaches would be so much "chicken-feed" to her. The old boy told me afterwards that he thought I was crazy, but nevertheless, he obeyed instructions, and got a succession of shocks. No. 1 was getting up steam in half the time; the four burners had more chance to deliver their "therms" than the previous six, in the same air space. I had fitted a blower, and told him how to use it, so he put the blower on and replaced the smokebox front, immediately receiving shock No. 2, as the safety-valves promptly lifted. Then came No. 3; he had previously opened the regulator full, to get her to start and run. He did so again, and there was a terrific roar, and the engine nearly jumped off the track, as the wheels spun like a buzz-saw. He throttled her down until the slipping ceased, and got shock No. 4, as she moved off with the 16 coaches, with sharp crackling beats instead of the soft and woolly "fuffs" as hitherto. He noted the time, lighted his pipe, and sat down to watch events. Shock No. 5 now took effect; instead of the engine faltering in speed, and apparently having a job to keep going, she got livelier and faster, as she warmed up, and soon was tearing around at a tremendous lick, the tinplate stock kicking up an infernal clatter as it swayed and rattled over the rail joints. Then came the last and biggest shock. Sixteen minutes passed, and she was going as lively as ever. Another sixteen, and she was still emulating Charley's Aunt. Yet another sixteen, and like Ol' Man River, she kept on rolling along! The amazed owner was just about to get up and stop her, as in the last couple of minutes the speed had further increased and she had begun to blow off, when she slackened, eased up, and finally came to rest fifty-one minutes after starting. There was a tiny drop of water left in the boiler, but the burners were out, as the spirit was all used up.

No Secret

To your humble servant, there was nothing extraordinary about the above performance. It merely represented the gain in efficiency obtained by using properly-fitted pistons and valves, correct valve-gear and setting, and blast arrangements ensuring that sufficient air passed through the firebox casing, to support complete combustion of the spirit. The owner's exact words were: "You've certainly taken the poison out of the gas!" Owing to the onward march of

The "Full-size Look"



Anno Domini, and the increased time it now takes to do these notes, and attend to the correspondence, I am not now able to oblige a friend; I get barely time enough to do my own bit of experimental work. But I have effected a few transformations; a specially-built L.M.S. 4-4-0 in gauge "O," by a commercial firm, at a fancy price, would barely haul its own tender, but I made it pull a dozen coaches for 19 minutes nonstop. A L.N.E.R. 4-6-2 of similar origin, which "konked out" in two minutes or so with five coaches, was improved to run for a fraction over 20 minutes with no less than twenty-seven coaches—and the firm who originally built it, had the nerve to want to borrow it for demonstration at a local exhibition, as a sample of their manufacture!

The above instances show what can be done with the smaller fry; and as stated above, builders of gauge "1" and gauge "O" locomotives only have to follow the same principles and construction, set forth in these notes for the larger sizes. If there were sufficient calls for a complete design in gauge "1," I would be glad to meet it, circumstances and the Knight of the Blue Pencil permitting; but at the moment, gauge "1" steam locomotive builders are definitely in the small minority, and that goes for gauge "O," too. In fact, in the latter size, they mostly prefer "mechanical mice"!

A Small Sister for "Doris"

It may be recalled, that after completing the *Doris* serial, I gave a brief description of a gauge "1" version which I called *Wee Dot like Doris*, and followed it by elongating this into a 4-6-2 which anticipated the full-size *Britannia* in many respects. The former was spirit-fired, and the latter, called *Diana* to distinguish it from the 4-6-0, was coal fired. Quite a number of these little engines were built, and the reproduced photographs show an example built by West Sussex reader, Mr. S. Reeves. Now some of our younger readers, born since these notes first made their appearance, may be astounded to learn that Mr. Reeves is an old-age pensioner; the engine is his first attempt at building a steam locomotive; it was built on the kitchen table; and the lathe he used, cost £2 (two, not two *hundred*!) some 45 years ago! The total time taken on the job, was 1052 hours; and the cost, without incidentals, came to £9 17s. 6d.

Our enthusiastic old-timer friend included several items in the job, that were not in the brief specification of the original *Wee Dot like Doris*. For example, he has incorporated the eccentric-driven feed pump for the boiler, which was described and illustrated for the coal-fired *Diana*. On account of restricted space on the 4-6-0, the unions for bypass and delivery pipes are located just in front of the firebox casing, instead of on the pump itself. Another addition is the *Tich* mechanical lubricator; this needed a bit of connivering, to get between the frames, along with the driving gear, but it was done, as shown in the underside view of the engine. Friend Reeves introduced an innovation here, fitting a tee-piece in the oil pipe at the front end, ahead of the leading bogie axle, with union on it. If it is desired to work the engine by air pressure, the air pipe is connected to the union, and the air goes to the cylinder *via* the oil check-valve. The dimensions of the lubricator are smaller than those specified for *Tich*, the pump and stand being made from ⅜ in. square rod. Only one wheel on each coupled axle, is a press fit; the other end of the axle is split, and can be expanded to a tight fit in the wheel, by a coned screw, flush with the wheel boss.

Mr. Reeves certainly deserves high commendation for his first attempt—truly, better late than never!—especially as it was made with such meagre facilities and equipment. Just one little thing, mars it; the base of the chimney needs a bit of thinning down.

A Gauge "1" Rhodesian B9

There are plenty of overseas locomotive builders who adopt gauge "1," because the engines they copy, run on the widely-used narrow gauge of

3 ft. 6 in., and the small edition comes out ■■ large ■■ the average British 2½-in. gauge job. One of these is shown in the reproduced photograph, and at first sight would easily be mistaken for her big sister. This is exactly what anybody might expect, for she was built by Mr. F. H. Sibson, a well-known South African journalist who is well versed in railway lore, and has contributed many articles to the *South African Railways and Harbours Magazine*, and other periodicals. He also writes railway yarns ; and incidentally, your humble servant inadvertently got the credit for one of them, among our fraternity in South Africa, because the hero was an old L.B. & S.C.R. driver who had served under Billy Stroudley, built small engines with Stroudley characteristics, and talked of the suburban lines through Tulse Hill and the Crystal Palace ! Did I hear somebody say " give ■ dog ■ bad name ? "

Long ago, Mr. Sibson made up his mind to build ■ gauge " 1 " South African engine, but circumstances hung out the job ; however, all things come to an end at last, and except for ■ few minor details, the engine is now complete. She was made up from what materials there were available, to look like ■ Rhodesian Railways 4-8-0 of class B9, which has small driving wheels ; those on the little engine are only 1¾ in. diameter, which is ■■ advantage, as it gives her plenty of tractive effort. She can pull nine heavily-built cars with only 20 lb. on the gauge. Slide-valve cylinders are used, the valves being operated by Baker valve-gear, whereas the full-sized job has piston-valves and Walschaerts gear ; a ■■■ of " use what you've got handy." As an example of what some locomotive-builders in remote parts, have to do in that direction, the only material available for cab and footplates, was sheet duralumin, ⅛-in. steel being unobtainable. Consequently, she is lighter than she should be ; and to counteract this, friend Sibson proposes to add a few lead weights to prevent slipping ; quite legitimate, under the circumstances ! At the time the photograph was taken, she had no place to show her paces ; but since then, an oval line 96 ft. around, has been completed, and I expect by this time, her owner and builder will have had a ride behind her. Here's hoping he gets ■■ much pleasure out of operating her, as his ex-L.B. & S.C.R. hero did in the story !

" Britannia " in Gauge " 1 "

Some of the " one-gaugers " who have written to me, ask for details of *Britannia* in that size. I have referred to this matter before, but here is some additional useful information that will help them. I referred above, to the gauge " 1 " coal-fired 4-6-2 *Diana* being in some respects ■■ anticipation of *Britannia*. Blueprints of this engine are obtainable from the " M.E." offices ; and if would-be builders of the latter engine obtain them, and use them in conjunction with the drawings and instructions now being published for the 3½-in. gauge engine, they should be able to manage the half-size edition without any trouble. For example, the *Diana* frames, bogie, and pony truck can be used, but made to half the given principal dimensions, such as wheelbase, cylinder position and so on, of the 3½-in. gauge *Britannia*. There is no need for such refinements as the ball-bearing axleboxes, built up leaf springs, and so on, in ■ gauge " 1 " job intended for hard work. Same applies to cylinders and motion, *Diana's* slide-valve cylinders will fill the bill. *Britannia's* valve-gear dimensions can be used half-size, if Walschaerts gear is desired, but the gear should be made single-sided, same as I specified for *Dyak* and other 2½-in. gauge engines. This not only simplifies the construction, but is more efficient ; the parts can be made more robust without being clumsy, as mentioned in June 5th issue, yet the outside appearance is exactly the same as if the fully-detailed arrangement is fitted. Should there be any call for it, I would gladly give a plan drawing showing how the single-sided arrangement is made and erected. No forks are needed in the actual valve-gear ; the only one is at the top of the combination lever, and the expansion-link doesn't need any slotted trunnion block. On a gauge " 1 " engine it would be more convenient to use a " pole " lever in the cab, than the screw arrangement given for the 3½-in. gauge version. Personally, I am ■ great believer in the simple loose eccentric for "scenic " work ; you can't notch up when running, ■■ you don't ride with the engine, and if the loose eccentrics are set to cut off a little over half-stroke, say 55 per cent., the steam consumption will be about as economical as is practically possible.

As regards boiler details, I could easily indicate the modifications necessary for a gauge " 1 " *Britannia* boiler, when describing and illustrating the 3½-in. gauge boiler ; and will do so if there should be any call for same. I might add here, that it is no game of Curly's to force instructions and drawings on readers who have no use for them, and just don't want them. If you don't like the radio programme—or the announcer's accent !—you just switch off ; 'nuff sed !

Country Cameo

The ancient traction engine, one of the last survivors of ■ fine race, was slowly and laboriously pulling a loaded farm wagon up the incline of ■ hump bridge over a busy main line, alongside the country station. " Clink-um-doo-dle ! Clink-um-doo-dle ! " went the big-end, crankshaft, and first gear-shaft bearings, as the old girl valiantly struggled up the grade. At the exact instant her leading-wheels gained the summit, there was a loud " Whooooo-oooo ! " and an express train came tearing around the curve, shot under the bridge, and roared through the little station. " Clackety-clackety-clack-clack-clack ! " said the flying wheels of the class 7 Pacific, as she raced through the frog of the crossing.

The old driver of the traction engine shut his throttle, gazed at the speeding train, and watched it disappear around the next curve. Then he shook his head sadly, as he turned and contemplated his decrepit steed. " Ar," he said, with ■ deep sigh, " naow, if 'er 'ud ony goo loike she, we'd soon be 'oam, sure-lie ! " and he opened his throttle once more, carefully piloted the poor bundle of old iron down the other side of the hump bridge, and proceeded on his three-miles-an-hour journey. *Sic transit gloria mundi !*

A 1¼-in. Scale "Big Lion"

by G. Thomas

THE photograph reproduced is of my 1¼-in. scale Fowler "Big Lion," which is the second showman's engine I have built. It was constructed from measurements taken from the prototype and scaled down to my own drawings. The overall length is 26 in., width, 9 in., height to top of funnel 14½ in. The boiler is 3⅛ in. diameter and has eleven ⅜ in. tubes; working pressure, 85 lb. p.s.i.

The cylinder block was made from my own pattern; the only other casting is the flywheel, and both were cast for me locally. The bores are ⅝ in. and 1 1/16 in. by 1¼ in. stroke. Valve faces are machined inclined, as on Fowler prototypes; the connecting-rods have adjustable big-end brasses to take up wear. Correct Fowler 3-speed is fitted; top gear is inside the dished flywheel, second gear between horn-plates and bottom outside offside horn-plate.

Regulator and simpling valves are of the flat valve pattern. Four drain cocks are fitted, all operated by one control.

Front wheels are 5⅝ in. diameter, 15/16 in. wide; rear wheels 8⅛ in. diameter, 1⅞ in. wide, and all wheels are built up from sheet steel—wheel diameters do not include tyres. The rear rims are rolled and welded from ⅛ in., while the ⅜ in. by ⅛ in. T-rings are turned on the faceplate. Spokes are 5/16 in. by 1/16 in. and are made all in one piece. Front wheels are built up from 1/16 in. sheet steel.

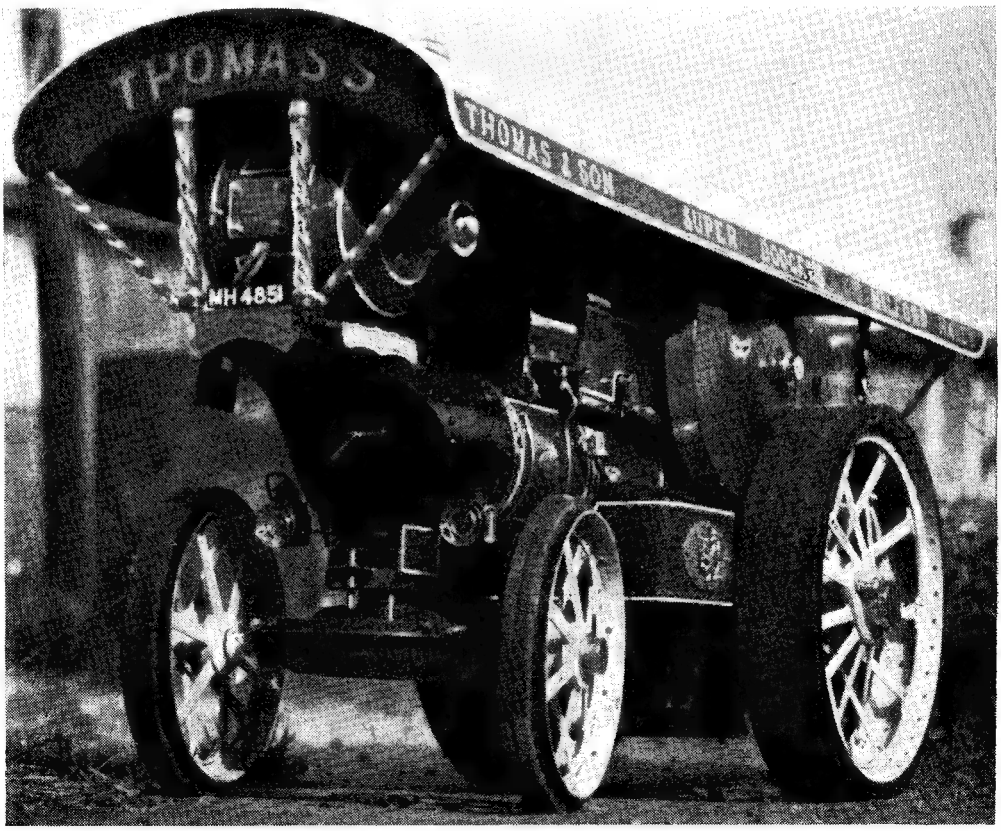
The name plates, *Lady Janet*, were cut from 15-thou. brass foil and soldered to a brass plate. "John Fowler Co. Leeds Ltd." under the numberplate, was chiseled in ■ plate the same as the official number on the side of the boiler.

A water lifter is fitted to the offside of the belly-tank, which is connected to ■ bunker tank. A crankshaft-driven water-pump in the cab draws from the bunker tank; an injector is also fitted on the rear nearside of bunker.

The dynamo lights ten lamps under the canopy at about 150 engine r.p.m. The dynamo, windings and steam gauge are the only things I did not make.

The boiler makes ample steam on anthracite and the engine looks very realistic in the dark with her lamps and gentle rock to and fro. All the work was done on a Gamage 3-in. lathe.

Time taken to complete was three years.



*The Crofton Beam Engines

by Ian Bradley

(Photographs by H. H. Dennis, Newbury)

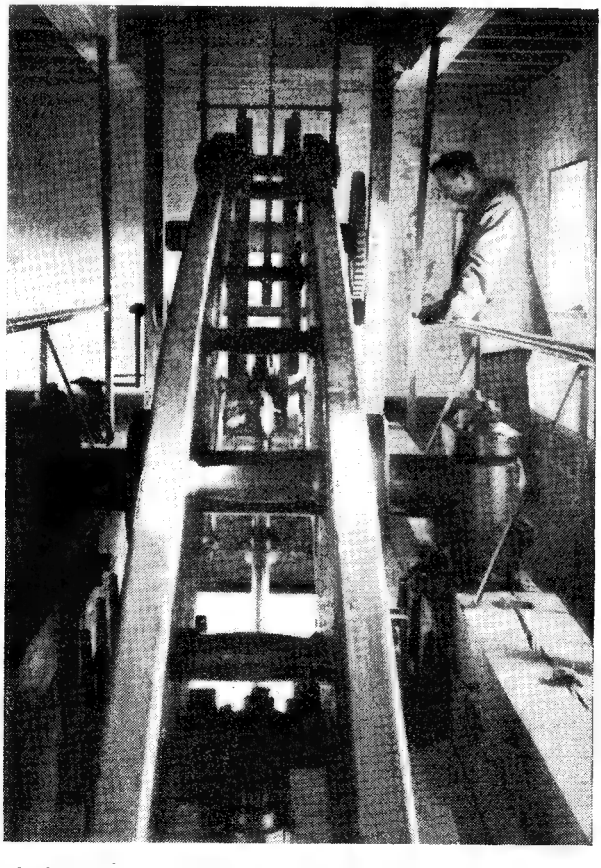
ON a recent visit to the Crofton Works, I was fortunate in being present when the condenser air pump of the No. 1 engine was having its cylinder cover and piston removed for examination. For a week or so previously, the engine had become somewhat temperamental, and the vacuum gauge showed that there was some instability in the condensing arrangements. At first, it was thought that the piston-rod gland needed repacking and that this would cure the trouble. However, when the piston itself was withdrawn and lifted on to the engine-room floor, the large rubber disc-valve fitted on the upper face of the piston was found to have split. As a matter of interest, this was the first time that anyone present had seen the air pump dismantled. Some modifications had clearly been made to the piston, presumably during the time the G.W. Railway Company had the care of the plant, for some of the parts were stamped G.W.R. In James Watt's day, the valves were made of wood, but the present valve is a disc of rubber about 1 in. thick and some 18 in. in diameter, and it was this part that had split.

The valve is threaded over the piston-rod and is retained in position on the upper surface of the piston by means of a hemispherical and perforated retaining-piece. By means of a pair of nuts on the piston-rod the retaining-piece is held against a shoulder on the rod, leaving the rubber disc free to float up and down over a predetermined distance. It seems possible that some modifications have been made to the top of the piston. This now resembles a large perforated circular manhole-cover having rectangular perforations radiating from the centre.

The main body of the piston is no doubt the original Watt component, and has been machined to accommodate the perforated plate previously mentioned. The piston has no packing but is provided with five rings machined on its edge to form a water-seal.

The water pump driven by the No. 2 engine is of the ram-type and has an output approximately equal to the pump on No. 1 engine.

In addition to the pumps already mentioned, each engine has, of course, a boiler feed pump, both of which are of the same type.

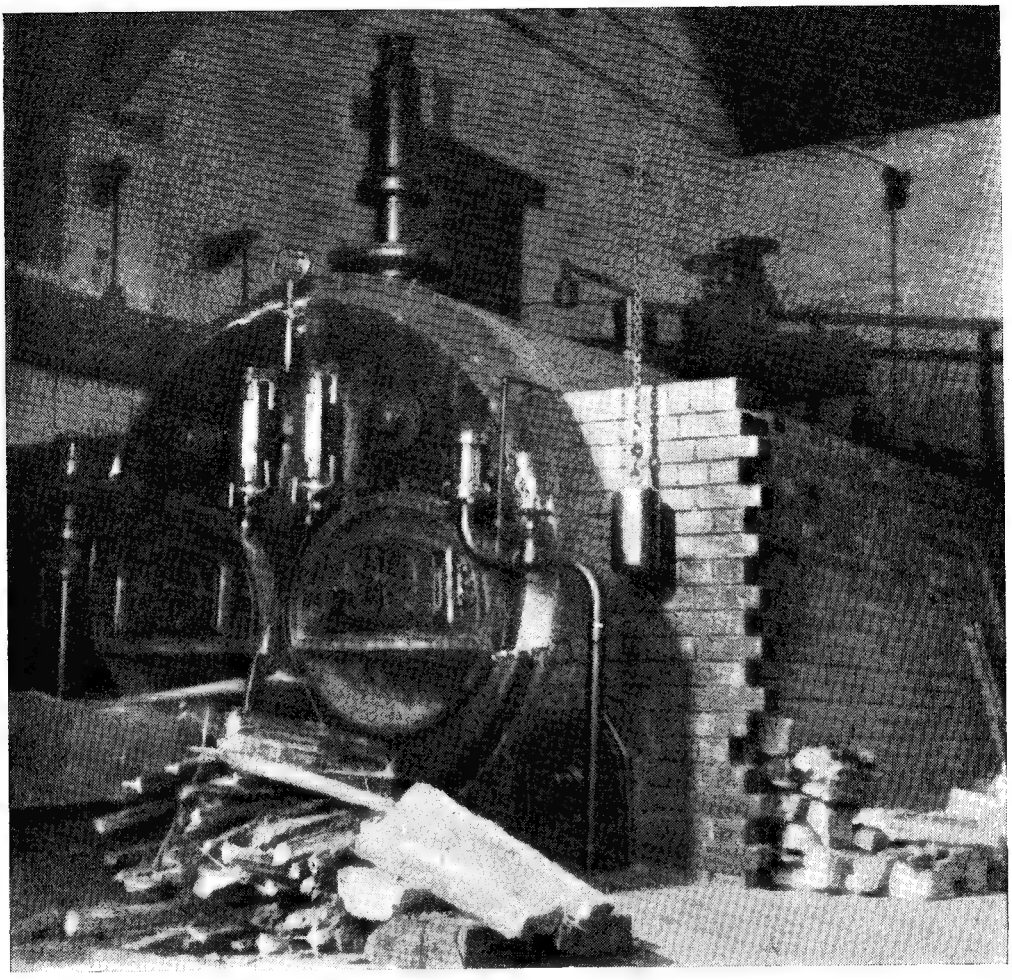


The beam of the No. 2 engine, showing the piston-rod linkage

The Boilers

The original boilers are believed to have been of the haystack pattern. There were five of them and they were mounted in the open, occupying the space that is now the site of the present boiler-house. Unfortunately, no illustration of these boilers has been found, and their disposition must be a matter of conjecture. Coal was brought to the site by canal, and the passage way used to wheel the coal from the canal to the works can still be seen. The passage runs under the present G.W.R. line. Since the railway

*Continued from page 787, "*M.E.*," *June* 19, 1952.



One of the pair of boilers at Crofton

company, when building the line, threw a bridge over the coal passage, it seems likely that coal supplies may have been waterborne until quite late in the last century, and possibly early in this one Records of canal traffic show that, at one time, coal was being regularly carried as freight.

The present boilers were installed in 1890. They are Lancashire boilers, 25 ft. in length, made in the Swindon works of the G.W.R., and are believed to have been taken from the Severn Tunnel pumping station. The illustration shows one of the boilers the other boiler is set at right-angles to the first and is housed in the lean-to building seen in front of the illustration of the exterior of the works. The condition of both boilers is excellent, and only minor additions have been made to them from time to time in order to comply with the requirements of the insurance engineers.

The working pressure is 20 p.s.i., and the coal consumption 25 cwt. for an eight-hour working day. This corresponds to a consumption of 3.125 cwt. per hour and the pumping of some 44,000 gals. of water for every 1 cwt. of coal consumed.

When one engine at a time is working, as is the case today, only one boiler is fired.

Attached to the works, but separate from the main building, is a blacksmith's shop. This has been a fruitful source of old tools such as special spanners and the like. An example is the ring spanner illustrated in Fig. 6. This is a truly formidable affair, and is used for doing up the main pump-rod nut on the No. 1 engine. Words cannot do justice to this tool, but it is hoped that the photograph together with the dimensions given on the sketch will help to convey something of the magnitude of this spanner. The tool illustrated in Fig. 7 was also unearthed in the blacksmith's shop ; this nut-cracker-like appliance is thought to be a device for sizing and polishing such parts as piston- and pump-rods.

It is supposed that abrasive material was held between the jaws of the device whilst pressure was applied by the handles.

The gimlet-like probe illustrated in Fig. [illegible] is used for extracting worn packing from stuffing-boxes. I do not know how old this tool is, but it appears to be quite aged; presumably, it was made in the blacksmith's shop.

Many of the tools that have been found are being cleaned and hung up in special racks by Mr. Wilmot, the engineer-in-charge.

Some of the spanners discovered were found to be badly damaged. Many of these tools are of direct use about the plant, for the special nuts that they fit have been located; for example, the large square nuts retaining the base of the main pump cylinder on No. 1 engine and located at the bottom of the well. The spanner to fit these nuts was found to be split. However, the

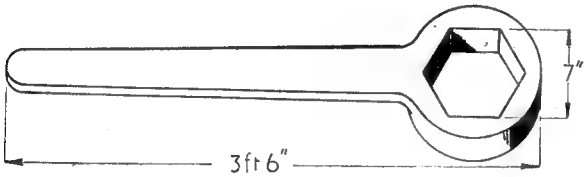


Fig. 6. Spanner for the main pump-rod nut, No. 1 engine

foreman fitter of the Inland Waterways Executive at Gloucester has taken the tool away and will shortly be returning it after welding and restoring it to its proper condition.

It seems likely, therefore, that the pumping installation will soon be unique in every way, having a full set of tools for maintenance purposes that may well be the originals together with numerous spare parts that are undoubtedly of great age.

The Authorities Responsible

The Kennet & Avon Canal Company, as the owners, were originally responsible for the works. Later the canal became the property of the G.W.R. Company and was adminstered by them. All necessary maintenance work was then carried out by a team from the Swindon locomotive works, who were quartered in one of the familiar engineering department vans located in a convenient siding whenever lengthy operations needed to be carried out.

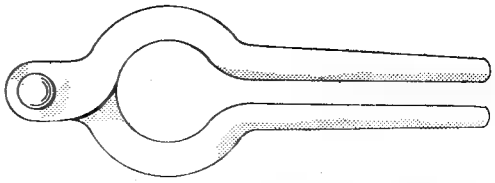


Fig. 7. Tool for polishing piston- and pump-ro

After nationalisation, the works passed into the hands of the Inland Waterways Executive. It is refreshing to be able to report that this organisation appear to be fully aware of the unique qualities of this historic pumping plant, and that the Executive seem to desire that the plant should be maintained in first-class order. It is to be hoped that this will continue to be their policy. The numerous foreign visitors, and especially those from America, who come to Crofton to see the works is evidence that the installation has become a national engineering monument that should be preserved for posterity.

The Engineers-in-charge

It is an unfortunate fact that many of the old records have been lost. As a result, the earliest name recorded is that of Thomas Hocking, Senr., who came from Cornwall in 1847 to supervise the erection or modifications to the No. 2 engine and remained to take charge of the plant after work on the engine had been completed. In 1865, he was succeeded by his son who had previously been apprenticed to the Swindon Works of the G.W.R. Co. Subsequently,

Fig. 8

Thomas Hocking Junior, went to Brentford Water Works after leaving Swindon, working there before coming to take charge at Crofton.

In passing, it is perhaps interesting to note that two other Cornishmen who came to assist in the erection of No. 2 engine, Wm. Locket and Henry Hoskins, stayed on at the works as firemen.

Steels—Ancient and Modern

From the "gossip" column of an American newspaper we have taken the following:—

"I keep reading that steel is better than it ever was, the new methods have created astonishingly strong steels. Maybe, but there is an old church in Warwickshire, England, which had a pendulum clock . . . It stopped one day when it needed a link between the pendulum and the works . . . The verger's wife took a steel from her corset, and she and her husband fixed the clock . . . That thin blade of steel held the pendulum for 17 years . . . It broke last year, fine tempered steel was put in its place . . . It lasted one week—and snapped . . . Five more did the same thing. But the town has its church clock going again . . . An old lady in the town of Knowle sacrificed a steel from her corset."

We can only hope that this second steel from a corset will last another seventeen years; for we feel rather perturbed as to what is going to happen when the supply of steel from this particular source runs out!

CONVERTING A GRAMOPHONE TO ELECTRIC DRIVE

by "Base Circle"

FOR quite a number of years the family radiogram consisted of an ancient acoustic machine with the usual spring-driven motor, but with the sound-box replaced by an electrical pick-up connected to a table model receiver. This arrangement was, of course, supposed to be purely temporary but like most temporary rigs it did duty for a long time. The idea, however, was that eventually an electric motor would provide the power while a proper amplifier would provide the noise. Unfortunately the job was put off so long that when at last it was put in hand the electrical member of the family had departed for foreign climes, so that a much less ambitious scheme had to be adopted. What was eventually decided on was to fit the electrical drive and to house the existing receiver inside the gramophone cabinet. This combination has now been in use for over a year and has proved quite satisfactory. The fact that there are now not so many cables trailing across the floor has made the arrangement find favour with the household authorities and that, I think readers will agree, is in itself quite an achievement.

Now, though radio and gramophone work may be a bit outside the scope of THE MODEL ENGINEER, a description of the conversion of the spring-driven turntable to electric drive may prove of some interest. It was at first intended to make a complete new driving unit—that is, a motor connected to the turntable spindle through a suitable reduction gear and fitted with a governor of some kind. On examining the spring motor, however, it appeared that a simpler, if less efficient, solution was possible—a solution, too, which entailed considerably less work. Well, needless to say, the easy way was chosen!

The plan was to remove all the gearing from the motor except the drive between the governor spindle and the turntable, and to drive the turntable spindle by means of a worm reduction from the motor. A suitable motor for the job was available—it had been picked up in the local street market. It is of unknown make but it has the very essential merit of running perfectly silently, and it has never, so far, given the slightest trouble. There has been, of course, quite a spate of government-surplus motors on the market which would appear to be quite suitable for a drive such as this.

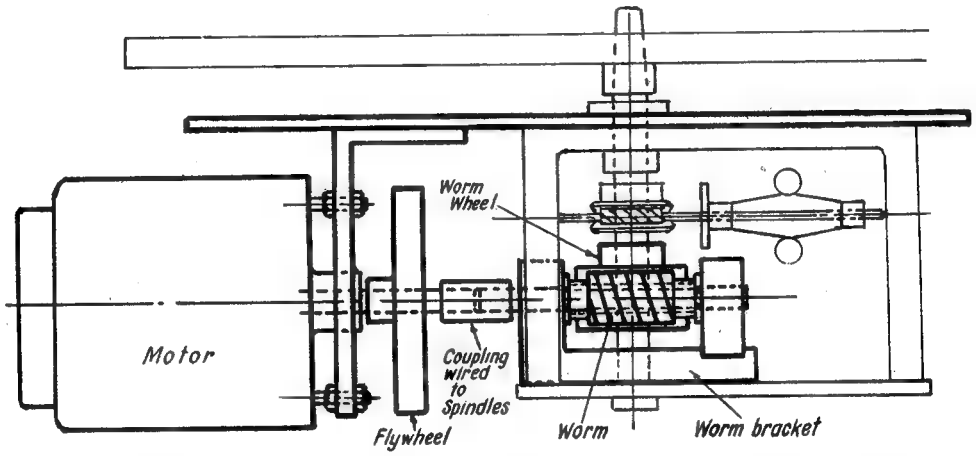


Fig. 1. Arrangement of electric drive. New parts outlined in heavy lines, original parts in light lines

Fig. 1 shows the general arrangement of the drive. It will be seen that a plate is fitted right over the top of the spring motor to carry the electric motor. The drawing shows this as a plain flat plate, but in actual fact it is flanged over along the edges to stiffen it. As the motor was arranged for end-mounting, an angle-plate was fitted to carry it. The coupling between the motor and the worm reduction is a piece of rubber tubing of suitable bore. The spindle, which is integral with the worm, is mounted in bearings in the bracket, which is screwed to the bottom plate of the old motor as shown. The worm drives the turntable spindle by means of the worm wheel, which is grub-screwed to that spindle. A flywheel is fitted to the motor spindle. This was added for a reason which will be given later.

The motor spindle was found to run at about 1,200 r.p.m., and as the standard speed for gramophone records is 78 revs. (ignoring the more modern slow-speed records) it was decided

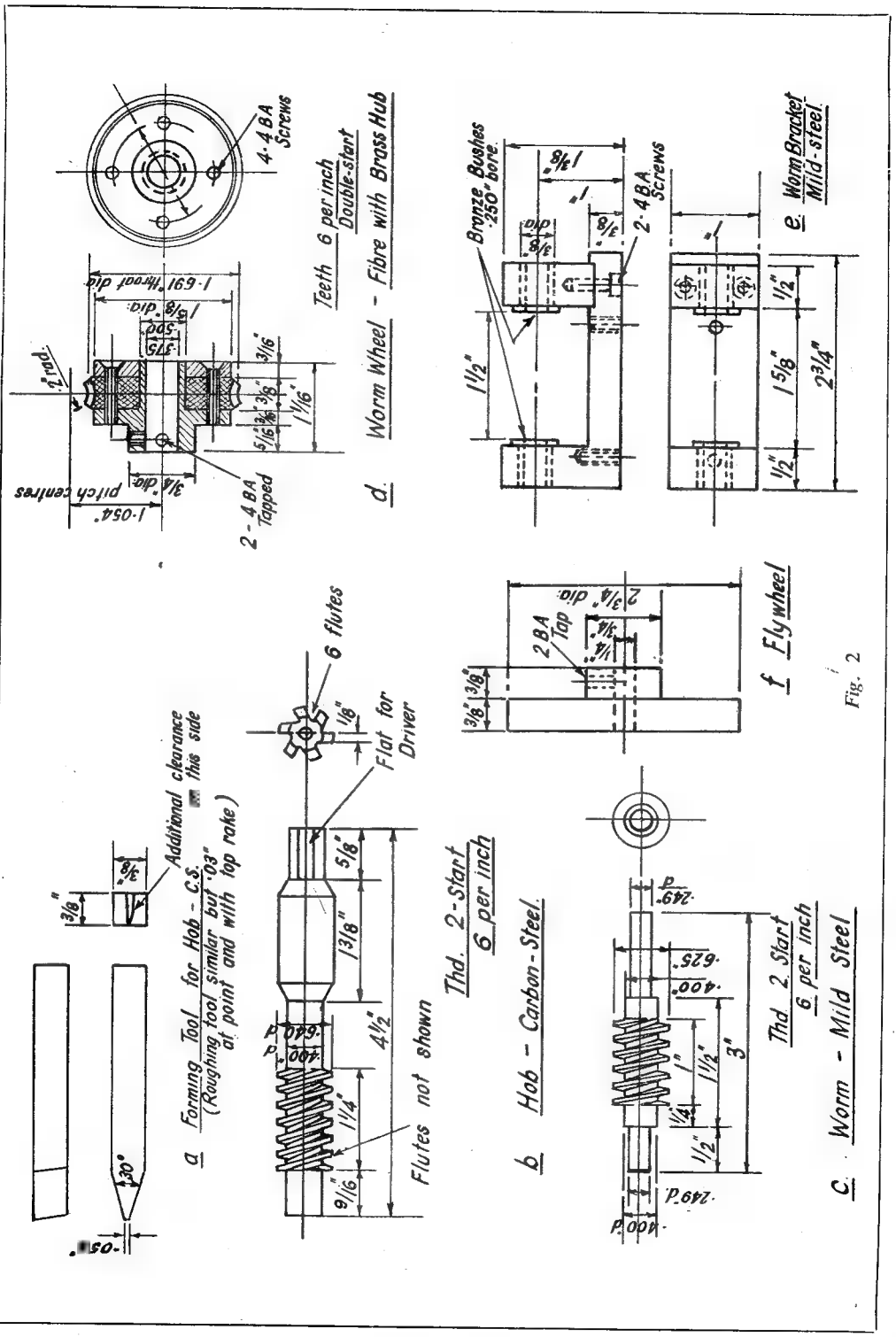

4-4 BA Screws
1·691" throat dia.
1⅝" dia.
.375" pad.
3/16"
3/8"
1⅛"
5/16"
¾" dia.
1·054" pitch centres
2-4 BA tapped
Teeth 6 per inch Double-start
d. Worm Wheel - Fibre with Brass Hub
Bronze Bushes .250" bore.
⅜" dia.
1½"
2-4 BA Screws
e. Worm Bracket Mild-steel
1½"
1⅝"
2¾"
2 3/4" dia.
2 BA Tap
⅜"
f Fly wheel
6 flutes
⅛"
Flat for Driver
⅝"
13/8"
4½"
.640" P.
.400"
1¼"
9/16"
Flutes not shown
Thd. 2-Start 6 per inch
b Hob - Carbon-Steel.
Additional clearance this side
Forming Tool for Hob - C.S. (Roughing tool similar but .03" at point and with top rake)
30°
.050"
.249" P.
.625"
.400"
1½"
3"
¼"
.400" P.
Thd 2 Start 6 per inch
c. Worm - Mild Steel

Fig. 2

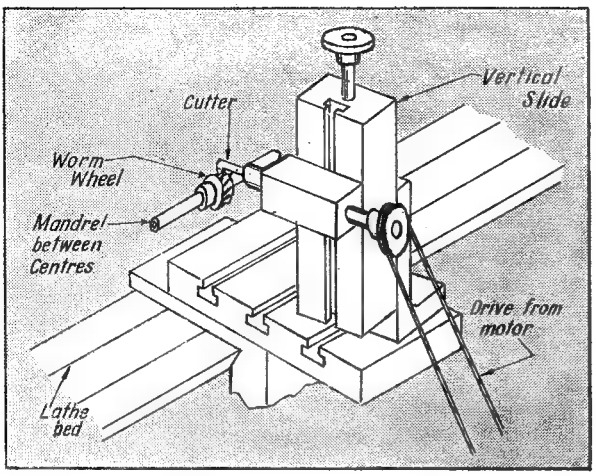


Fig. 3. Gashing the worm wheel

to adopt a reduction of 15 to 1. A single-start worm to give this ratio would, of course, mean a 15-tooth worm wheel, and, unless the teeth were very large, would result in a very small wheel—too small to give a satisfactory drive. The alternative was a two-start worm, and, although this was likely to prove a much more troublesome job, it was decided to go ahead with it.

A Difficulty Overcome

To make such a drive entailed the making of a hob, and, as this was likely to be the most difficult part of the whole job, it was tackled first. It was decided to use a 6 t.p.i. worm, as this would give a worm wheel of reasonable size. The tool for finishing the worm thread is shown at *a*—Fig. 2. This tool was ground from a piece of high-speed steel to a template carefully cut out in sheet metal. A roughing tool was also made. This is similar to the finishing tool but is only 1/32 in. wide at the end, and has about 10 deg. top rake, while the finisher is left flat on the top to preserve the form. The hob is shown at *b*—Fig. 2. It was made from a piece of carbon-steel. The forming of the thread was quite a tricky job, as the depth of thread is so great and carbon-steel is not the easiest of materials to machine, but with a great deal of patience and a considerable amount of luck it was successfully completed with no more serious mishap than the breaking of the roughing tool. It will be noted that the ends of the hob are turned down to the root diameter of the thread. This is a convenient method of ensuring that both threads are cut to the same depth. There are various ways of cutting multiple threads but in this case a driver plate with two positions for the driving pin at 180 deg. was used, one position of the pin giving one thread and the other position giving the second thread. To avoid chatter, the carrier was bound firmly to the driving pin with a leather thong. For such a short length of cut it was found to be easier to pull the belt round by hand rather than use power. The tool was returned to the beginning of the cut by means of the hand wheel on the end of the lead-screw, the cone pulley being freed by disengaging the back-gear clutch—a method which avoids declutching the lead-screw with the attendant risk of mistakes. I should have said, by the way, that the lathe used was a Drummond 3½ in. about 30 years old. The flutes were cut on the shaper, the hob being held in the vice and the indexing being more or less by eye—accuracy as regards this point is of no consequence. The hob was hardened by heating to bright red and quenching, tempering being done on a tray of sand over the gas stove. As the worm wheel was to be made of fibre to ensure quiet running, a blue temper was quite hard enough and helped to avoid risk of breakage.

The Worm

This is shown in Fig. 2 at *c*. By the way, it will probably be noticed that the drawing is incorrect in that it shows the worm as single-threaded instead of double-threaded. The lathe setting for the hob was, of course, used for the worm, the only difference being that the finishing tool had to be reduced in length until the width of the end was 0.052 instead of 0.054, as for

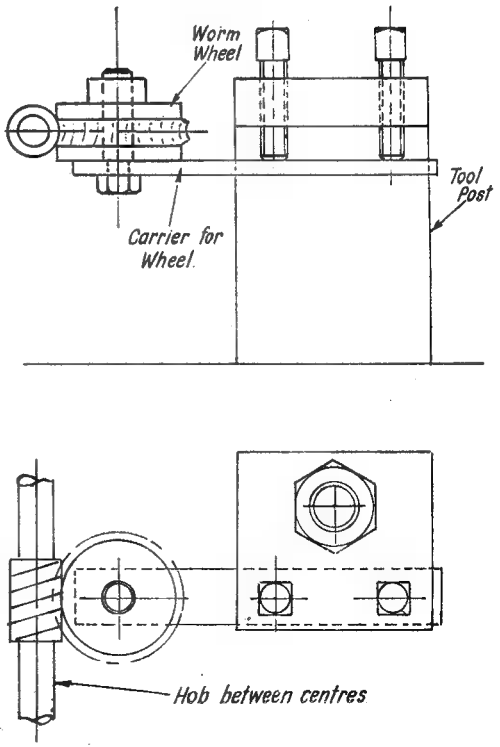


Fig. 4. Hobbing the worm wheel

the hob. Being of mild-steel, the threading of the worm was managed comparatively easily.

The worm wheel is shown at *d* (Fig. 2). As will be seen, it involves quite a bit of turning, as it is built up—a fibre wheel mounted on a phosphor-bronze hub. I have called the material fibre but actually the wheel is made from a timing wheel from a very ancient car engine, dating back to the times when reasonable quietness of running could only be achieved by making one of the timing wheels of a non-metallic material. Whatever the composition may be, it has proved ideal for the purpose for which it is now used. The drive is quite silent and after a year's running there is no apparent wear. When the various parts of the worm wheel had been assembled, the wheel was mounted on an arbor between centres and, using a 60-tooth wheel for dividing, as has so often been described in the pages of THE MODEL ENGINEER, 30 gashes were cut, the set-up being as shown in Fig. 3. The cutter is mounted on a drilling head carried on the vertical slide, which, by the way, is not quite so tall as the drawing would suggest. The slide is set round to the correct helix angle and the drive is by round (sewing machine) belt from one of those converted rotary-converters which have been so plentiful of late. The tool is very simple—it consists of a piece of silver-steel bent at right-angles, dressed roughly to the tooth shape and hardened. The cutter was fed into the wheel by means of the screw on the vertical slide. When the wheel had been successfully gashed, the hob was mounted between the lathe centres while the wheel revolved on a pin carried on a strip of steel clamped in the tool post, all as shown in Fig. 4. The lathe was started up and the hob carefully fed into cut, using the cross feed.

The rest of the job was comparatively plain sailing. The bracket shown at *e* (Fig. 2) was made and suitable bushes fitted. It was then mounted on the bottom plate of the motor, as shown in Fig. 1. The holes for the retaining-screws were made with ample clearance so that the best position for the worm relatively to the worm wheel could be found by trial and error. After quite a lot of experiment a satisfactory position was found and the bracket was finally dowelled in place, while the worm was firmly fastened to the turntable spindle, using two grub-screws.

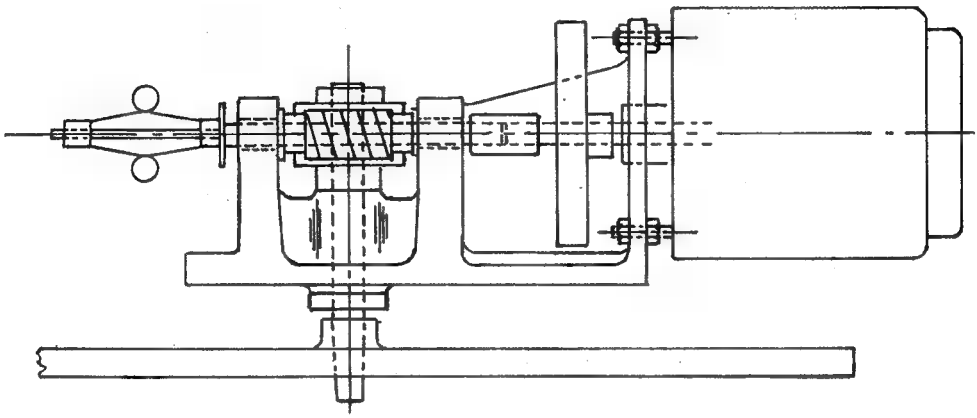


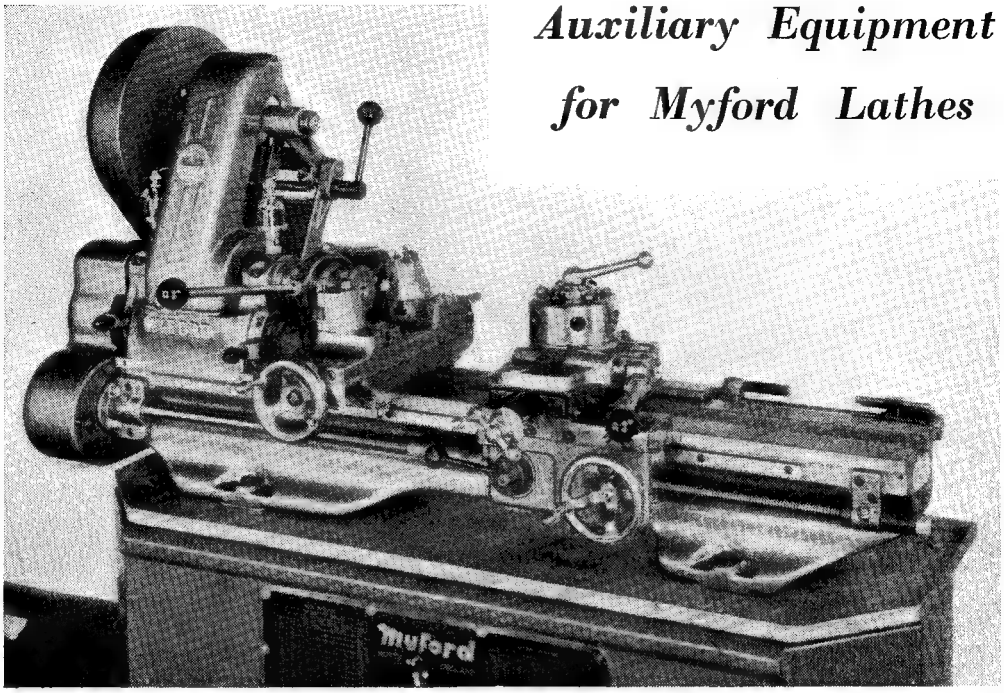
Fig. 5. How it should be done !

Well, when everything was thus finally assembled, the job appeared to be thoroughly successful except for one thing. This was that when the motor was switched off the turntable stopped with a most alarming jerk, obviously throwing considerable strain on the gear teeth. It was fairly easily seen that what was happening was that the turntable, being heavy, was attempting to run on under its own momentum after the comparatively light rotor had stopped. The remedy was seen to be to fit a flywheel to the motor spindle. This was tried and resulted in an immediate improvement. After a bit of trial and error again, a flywheel, as shown in Fig. 2, was found to be just right.

Mechanically All Wrong

Finally, to disarm criticism, it may be as well to say that the design as shown is mechanically all wrong. First, we reduce by means of a worm reduction the speed of the motor to suit the turntable, then we gear up to the governor spindle, again using a worm gear. The right way would surely be something like the design shown very roughly in Fig. 5 where the governor is running at motor speed and is driven directly. Thus, one worm gear would be all that would be needed. Well, perhaps some day we may get a nice little aluminium casting and do something about it—who knows, we might even provide for the slow-speed records, too ! In the meantime the present arrangement is proving entirely satisfactory.

Auxiliary Equipment for Myford Lathes



The Myford M.L.7 lathe with special cut-off slide for front and rear tools, and six-station turret on cross-slide

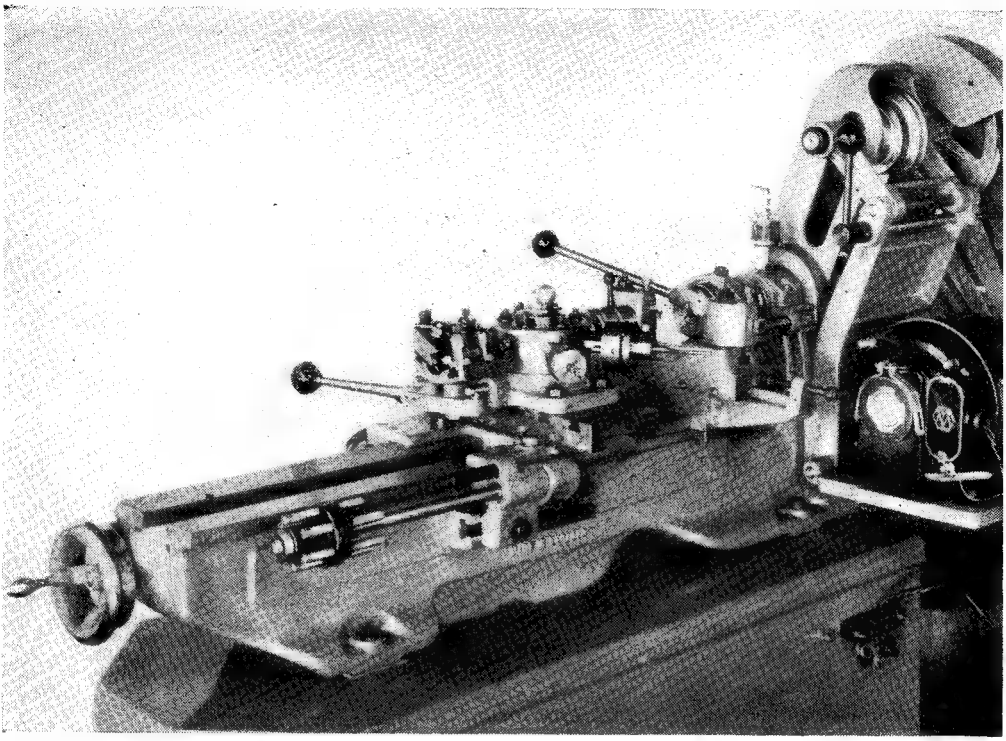
THE success of the well-known Myford M.L.7 lathe has been demonstrated, not only in the home workshop, but also in light industry, and many of these lathes are to be seen in use on full-time production of small components. So far as the lathe itself is concerned, therefore, no doubt exists as to its ability to cope with such work, but speed and facility in handling production work is much improved by the addition of suitable auxiliary equipment, and this matter has been given very careful consideration by the makers of the lathe in recent years. We have recently examined one of the lathes set up with the latest additions to the range of production equipment.

From the aspect of the average model engineer, who does not, in the normal way, undertake repetition work, the standard equipment is usually adequate, and apart from such fittings as a four-way turret tool holder in place of the plain tool-post, methods of expediting production do not make a very strong appeal. But there are very many lathe users among readers of THE MODEL ENGINEER, who find it desirable, or even necessary, to save time in producing batches of similar components ; and to these, the auxiliary equipment illustrated will be of interest.

The principal additions to the standard M.L.7 lathe consist of a six-station turret attachment for the cross-slide, and a special cut-off slide with front and rear toolposts. Of these, the former has been evolved from an earlier design which has proved its efficiency on both the M. and M.L.7 type lathes, and has recently been improved by modifications to the indexing plunger and its return mechanism. An additional improvement is the addition of indexing stop mechanism to limit the travel of the saddle selectively for the various tools. These include box tools with incorporated vee or roller steadies, drill and tap holders, expanding dies, etc., of the same pattern as used on regular production capstan lathes. In conjunction with the two tools (usually a parting tool and a chamfering or forming tool) in the cut-off slide, a cycle of eight distinct tool operations can be carried out with speed and precision.

The equipment illustrated also includes the Myford quick-action collet chuck, which can be operated without stopping the lathe ; this is also a well-tried device, having been first applied to the M. type lathe during the war. It will be clear that with the complete auxiliary equipment shown, the lathe is comparable in production capacity to a regular capstan lathe of similar size, and it is convertible for either this or its normal purpose in a very short time. The lathe tailstock is not capable of being used when the cross-slide turret is fitted as its functions are taken over by this fitment, which is positively located to ensure centralisation of the tools, though capable of cross traverse if desired.

Over fifty accessories for the Myford M.L.7 lathe are now available, including fixed and



Rear view of lathe, showing stop mechanism for turret tools

travelling steadies, plain and swivelling vertical-slides, dividing attachments, etc., and whether users are interested in "one-off" or quantity production, its versatility, in its application to every kind of workshop problem has a universal appeal. All enquiries regarding Myford products should be addressed to the Myford Engineering Co. Ltd., Neville Works, Beeston, Nottingham.

Refrigerator Construction

We have received from Messrs. Braid Bros., electrical and mechanical engineers, 50, Birchwood Avenue, Hackbridge, Surrey, a number of drawings and booklets giving useful practical information on the subject of refrigerator construction. These include a reprint of the article "A Domestic Refrigerator" by L. C. Sherrell, which appeared in the December, 1949, and January, 1950, issues of THE MODEL ENGINEER, and is reprinted with due acknowledgments. These can be supplied at 2s. 6d. each, or complete with the "M.E." blueprints of the Sherrell refrigerator, two sheets, at 9s. each. Additional items are blueprints for an absorption type refrigerator for electric supply or town and bottled gas, reference BV/A/E and BV/A/G respectively, and an electrically-driven compressor type refrigerator, BBC/C. These designs give sufficient information to enable the amateur engineer to construct attractive and thoroughly reliable refrigerators, using equipment and accessories which can be supplied by the above firm, and should be especially attractive to people who live in houses where space is restricted, as these refrigerators can be built into existing larders or cupboards.

A member of the "M.E." staff has built a compressor-type refrigerator from these components, which is now in regular service and entirely satisfactory.

Lists of components and designs are obtainable free on receipt of a stamped addressed envelope from the above company, to whom all enquiries should be addressed.

IN THE WORKSHOP

by "Duplex"

No. 118.—Locking the Lathe Mandrel

FROM time to time, an instruction is given in these articles to lock the lathe mandrel while carrying out some machining operation; for example, the mandrel must be secured against turning when cutting a keyway in a part held in the chuck, or when engraving the graduation lines on the drum of a feedscrew index.

The simplest way of locking the mandrel is that most commonly used when indexing a part from a change wheel secured to the tail of the mandrel; here, the mandrel is kept from turning by means of a detent, bolted to the lathe quadrant and furnished with a plunger having a conical tip to engage in the tooth spaces.

Positive Lock

If the change wheel is located by means of the usual key or register pin, the small amount of clearance provided, to ensure easy removal and replacement, will mean that a positive form of lock is wanting. It will then be necessary to take up any backlash present by attaching a cord to the chuck, and establishing a constant pull by suspending a weight from the lower end of the cord.

The change wheel can, however, be firmly secured to the tail of the mandrel by using the device illustrated in Fig. 3.

This attachment consists of a split bushing fitting closely at one end in the change wheel, and at the other in the mandrel bore.

A double-coned expander is fitted so that, when the central bolt is tightened, the attachment is firmly locked in both the change wheel and the mandrel. As will be seen in the drawing, two small tommy bars are provided to help in withdrawing the adapter where it is made a tight fit in the mandrel bore; in addition, the outer end of the draw-bolt is furnished with two spanner flats in case it should tend to turn as the draw-nut is tightened.

It has, however, been found in practice that, as shown in Fig. 5, the change wheel can be secured firmly enough for most purposes if the outer end of the bushing is formed with a flat shoulder, against which the wheel is pressed on tightening the expander bolt.

Locking the Mandrel from the Bull Wheel

As a rule, it is good practice to arrange that a locking mechanism is placed as nearly as possible in line with the displacing force, which in the

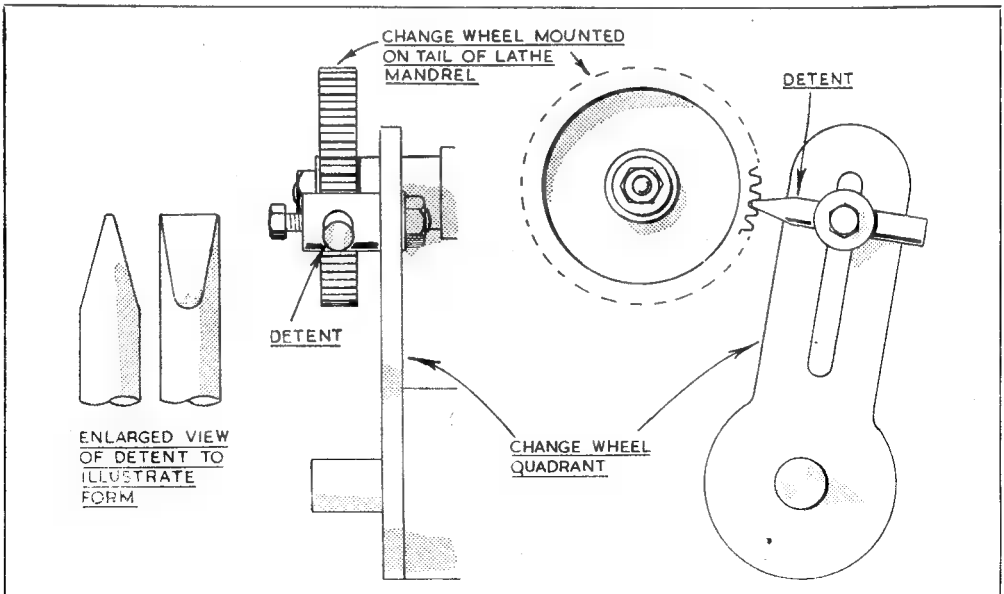


Fig. 1. *Locking the mandrel with a detent engaging a change wheel*

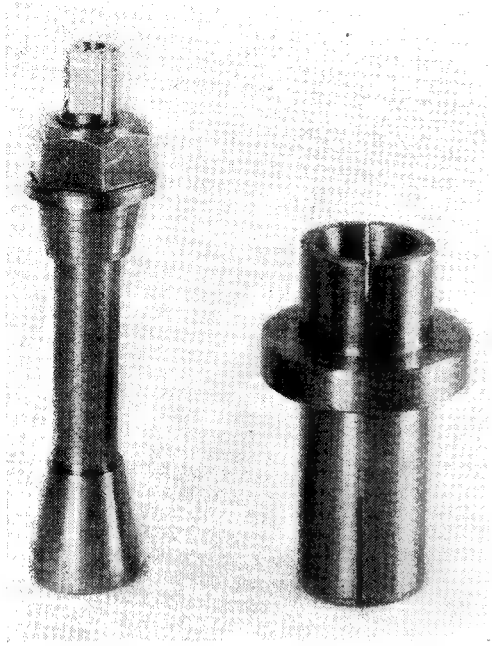


Fig. 2. Parts of the double-cone adapter

present instance is the reaction to the cutting tool.

Consequently, the large backgear wheel, or bull wheel as the Americans term it, is often used for this purpose. This wheel is always securely keyed to the mandrel itself and will, therefore, give a reliable lock if a suitable detent is added.

Some older lathes have the side face of the bull wheel drilled with a series of holes for engagement

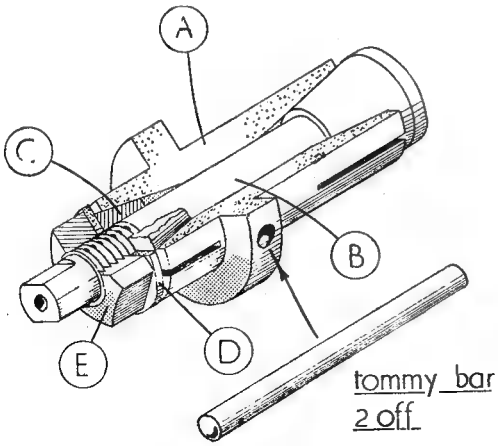


Fig. 3. Details of the adapter : "A"—the body ; "B" coned draw-bolt ; "C"—sliding cone ; "D"—washer ; "E"—draw-nut

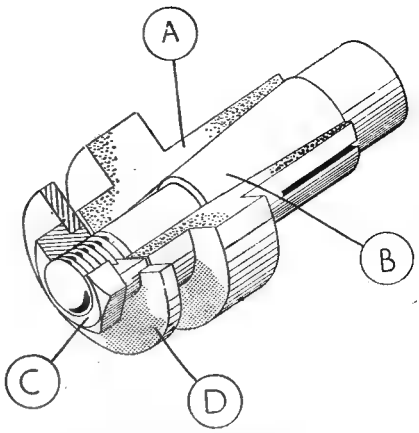


Fig. 5. Shouldered type of adapter : "A"—the body ; "B"—draw-bolt ; "C" and "D"—draw-nut and washer

with the coned tip of a detent attached to the headstock casting, as illustrated in Fig. 7 ; again, a division plate secured to the mandrel can be used in this way in conjunction with a detent of the same kind.

Holes drilled in the periphery of the chuck backplate can also be engaged by a detent, and when this method of locking is employed there is no danger of the chuck itself becoming unscrewed by the cutting pressure. It has been suggested that the mandrel can be locked by driving a hard-wood wedge between the belt pulley and the headstock casting ; nevertheless, those who value their lathes would do better to adopt a more mechanical and less barbarous method.

The bull wheel of the Drummond-Myford lathe has 66 teeth, so that, in addition to locking the mandrel, the detent will serve for making a number of useful divisions when machining work held in the chuck. If the mandrel is to be

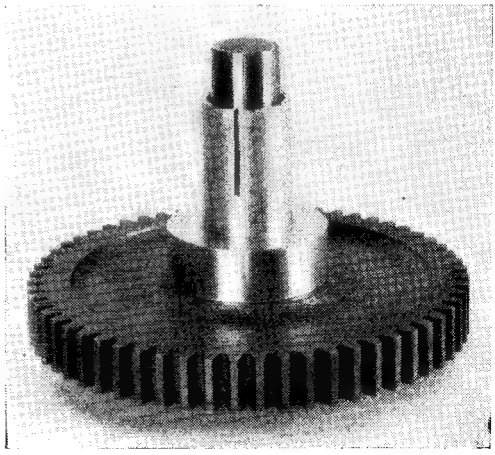
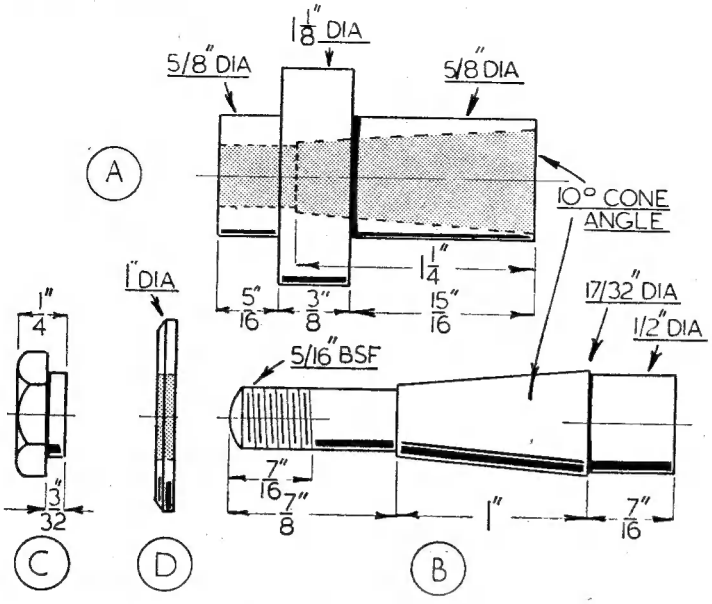


Fig. 4. A change wheel fitted to the adapter



Above—Fig. 6. The adapter parts lettered as in Fig. 5

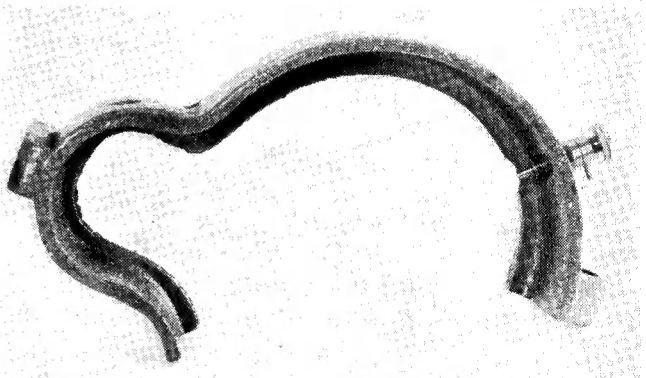
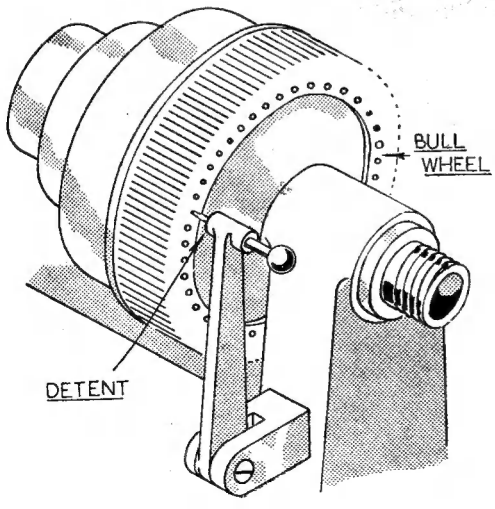


Fig. 8. The Myford-Drummond wheel-guard with detent in place

Below—Fig. 7. Locking the mandrel with a detent engaging the bull wheel



securely locked in this way, it is essential that the detent itself should be rigidly mounted. The forward wheel-guard fitted to the Drummond lathe is a robust casting securely attached to the headstock by means of two screws. This casting, then, will provide a most convenient and rigid mounting for the detent.

In the first place, a point is marked-out on the casting to afford a convenient operating position towards the front of the lathe, and as the curvature of the guard conforms to that of the bull wheel, the detent when fitted in place will lie with its long axis radial to the wheel.

At this point, the guard is drilled with a pilot drill and then spot-faced; next, the hole is enlarged to the tapping size with a 21/64 in. or a letter Q drill before being tapped $\frac{3}{8}$ in. × 26 t.p.i.

Making the mild-steel bushing and the detent itself are straightforward machining work needing no description, but care should be taken to form the conical point of the plunger to fit accurately in the tooth spaces of the gear wheel.

It is important also to fit a locking collar, so that the detent can be firmly secured when in engagement, as well as when withdrawn after use.

If the small finger lever fitted to the locking collar is made to lie in the downward position when tightened, there will be no danger of the plunger working loose as a result of vibration.

As a help when carrying out simple dividing,

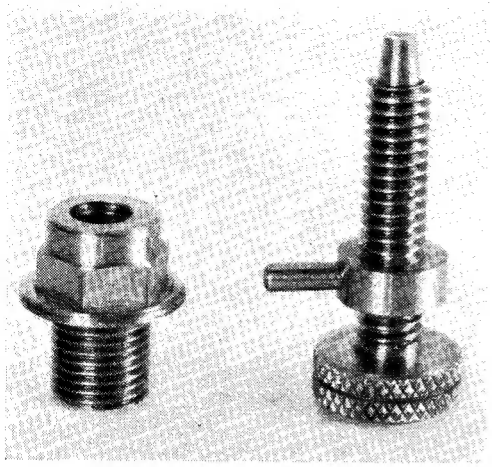


Fig. 9. Components of the detent

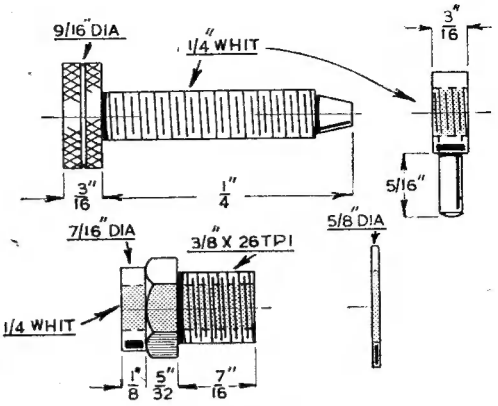


Fig. 10. Details of the wheel-guard detent

time will be saved and errors probably avoided if the bull wheel is furnished on its side face with painted marks to indicate divisions of 2, 3, and 6.

In addition, a painted arrow, showing the direction in which to move the pulley lock for engaging the backgear, may also be found useful.

PRACTICAL LETTERS

Model Speed Boats

DEAR SIR,—Mr. Liddell's comments on model speed boats are interesting, and whilst not fully agreeing with him, in that I myself welcome the "shape of things to come" in this respect, provided that they are the result of logical development, he may be justified in his statement that some of these boats are not models. We must remember, however, that most of them are largely experimental and that many constructors use experience gained on one boat as a foundation for the design of its successor, the first boat then being an experimental model for the second. The top speeds of these small boats, after allowing for scale effect, compare with full-sized racing boats to the detriment of the latter, and it may well be that designers of larger boats will use *Sparky* and other boats as models in some respects. If it were necessary for these small boats to be scale models of existing large boats, the hobby would by now most likely be extinct, as due to the far greater comparative effect of air lift, and the fact that a small boat on a choppy pond is equivalent to the full-sized job on a rough sea, the limit of speed would have been reached long ago. All we would have would be pretty speed boats at a sedate speed.

Designers of "pole" boats have to cope with high centrifugal forces, which also affect fuel systems, etc., and there seems little reason why they should also have to allow for the different circumstances of straight running, under which it is impossible, through force of circumstances, for the boat to be raced. Is there any precedent for the suggestion that a boat designed for speed alone should have to have the flexibility of power plant and adaptability of hull to travel at a small fraction of its designed maximum speed, although some boats, including my own, do so on occasion without difficulty?

The lift due to centrifugal force on the inclined tethering wire is comparatively unimportant, and does not help when one is unfortunate enough to have to find means of getting rid of apparently unavoidable air lift, after being fortunate enough to obtain a speed which is now considered fast.

I do not know the relative fuel consumptions of *Sparky II* and *Vesta II*, but my "A" Class steamer does rather less in miles per gallon than a 40 h.p. car. There is no doubt that the efficiency of this steam plant is only a fraction of that of an equivalent i.c. engine, but recent personal experiences make me question the suggestion that the limit of heat transmission of the flash boiler, under atmospheric conditions, in small boats, has been reached.

Yours faithfully,
Southampton. B. J. PILLINER, A.M.I.Mech.E.

Modelling a Gas Turbine Engine

DEAR SIR,—I am starting on the design and construction of a model gas turbine engine of the pure jet principle based on full-scale aircraft design.

Would any reader of THE MODEL ENGINEER, who has experimented in this field and met with major or minor success and be willing to enter into correspondence on the subject, kindly communicate with the writer to the address below?

c/o Barclay's Bank Ltd.
Regent Street,
Weston-super-Mare.

Yours faithfully,
L. G. FLETCHER.

Wheel-spin at Speed

DEAR SIR,—Mr. Cockroft's proposition in your issue of June 5th, 1952, is untenable. A stone projected horizontally does not cease thereby to be subject to gravitation, and as the horizontal speed is at exact right-angles to the acceleration due to gravity neither interferes with the other in the slightest degree, and the stone will take exactly the same time to reach the (horizontally level) ground as if it had been merely dropped from the same height : it is falling all the time and the speed of its forward travel (not its velocity, which is a vector quantity and includes direction of movement) remains constant, except for air resistance, until it reaches the ground.

The weight of a locomotive or other moving body, travelling horizontally in a straight line, is constant and its pressure on the rails does not diminish unless its shape is such, as in an aircraft, as to introduce a vertical force from air resistance. Otherwise there would be no point in restricting the speed of trains when passing over weak bridges.

One imporatant factor in wheel spin is the upward thrust caused by minute irregularities in the track, which momentarily bounces the wheels upward and so reduces, or even entirely destroys the static friction between wheel and rail upon which all locomotives (except on the cogged tracks of mountain railways) depend for movement. Once this happens, static friction gives place to sliding friction, which is smaller : for this reason brakes are less effective in slowing down a car when locked than otherwise. And it must be appreciated that although the wheel is moving forward as a unit, its point of contact with the rail is not, hence the friction, in the absence of spin, is static and not sliding.

Yours faithfully,

Edinburgh. G. STRUAN MARSHALL,
Group Captain.

An Apology

DEAR SIR,—In view of the many people from all parts of the country who came to our exhibition at Whitsun to see Mr. Lucas's Fowler Lion showman's road locomotive, I feel that I ought to explain its absence, and I should be glad if you would allow me to do so through the columns of THE MODEL ENGINEER.

Several months ago we obtained the advice of the police regarding the driving of the engine to the exhibition and were informed that all would be in order, provided trade licence plates were obtained. On the Thursday before the exhibition I obtained the approval of the superintendent of police to arrangements for driving the engine through the city and parking it at the exhibition hall, but to our great dismay, a few hours before the exhibition was due to open we were informed that the use of trade plates would not be in order. We had no time to make alternative arrangements for bringing the engine into the exhibition, and in any case the holiday traffic through the city would have made it wellnigh impossible to tow the engine in.

Fortunately, I was able to speak to a number of visitors who wanted to see the engine and they were able to inspect it where it is kept outside the city. Those who were not able to visit the engine may rest assured that their disappointment was no keener than ours at not being able to show it as advertised.

Yours faithfully,

Salisbury. R. A. READ.
Hon. Secretary, Salisbury and District M.E.S.

The "Duplex" Hacksaw Machine

DEAR SIR,—We are grateful to Mr. W. Kirkham, writing in THE MODEL ENGINEER, for his appreciation of the hacksaw machine, and many other correspondents have written in the same vein.

It is certainly heartening to learn that so many readers have found the machine capable of doing much useful and accurate work, and that no significant alterations of the design have been suggested. With regard to saw blades, the Eclipse high-speed steel blades have been found to give long service ; in fact, the first blade, after a year's hard work, was replaced for last year's "M.E." Exhibition only because the paint looked rather shabby, although its cutting qualities remained unimpaired.

This second blade is still in use and should remain so until "the event" in October. This long blade life is, no doubt, partly due to the accurate guidance given by the machine, for the blade is saved from the rough treatment it so often undergoes in hand sawing, resulting in broken teeth and wearing away of the set. We have not regretted fitting the Myford machine vice to the machine, as accurate cutting, needing only light finish-filing of the work, is the aim ; if the work has to be filed square after sawing, the purpose of the machine is largely defeated. As Mr. Kirkham rightly points out, the blade tension-adjuster should be accurately fitted, and not as in some hand frames, where, after tensioning the blade, the nut has to be turned back some distance in order to take the twist out of the blade. As it happens, the adjusters of our machines are fitted so closely that they have to be tapped back when replacing the blade.

Yours faithfully,
"DUPLEX."

Using Calor Gas

DEAR SIR,—There is a feature of Calor gas to which, I think, attention should be drawn, although the installation engineer usually warns people.

Since this gas is heavier than air, it sinks on leaving the jet of a Bunsen burner, or blowpipe, and, if one has not a light ready when the gas is turned on, there is usually a pool of flame over the top of the bench when the gas is lit. I have twice had pieces of rag set alight, and can imagine what would have happened had any meth. or paraffin been near.

I use a Chance Bros. Flamemaster blowpipe with their butane nozzle and air from a rotary blower, and find the combination very convenient indeed ; in fact, the pipe is a veritable "Rolls-Royce" job for all silver-soldering. I even brazed up the "M.E." traction engine boiler with Johnson Matthey D3 alloy, using it with plenty of coke packing.

Yours faithfully,

Tewkesbury. W. H. LAMBOURNE.

"That Wonderful Year . . ."

DEAR SIR,—I am glad to note that Mr. Geoffrey K. King enjoyed my series of articles under the above title, and am grateful for his added note about the Ransomes engine shown in Fig. 47.

With reference to his queries about the engines shown in Figs. 39 and 46, however, I can say definitely that these were attributed to Messrs. Clayton & Shuttleworth and E. R. & F. Turner respectively, in the works of reference I consulted at the time—volumes which included the *Official Catalogue of the Great Exhibition*, *The Illustrated Exhibitor*, *Illustrated London News*, and similar works. Unfortunately, at the present time I am not in a position to be able to give Mr. King the exact references, but I do assure him that I was most careful to ensure accuracy when writing the articles themselves.

Yours faithfully,
"THE DOMINIE."

N.B., Canada.

Tapping Sizes

DEAR SIR,—On comparing the tapping sizes published in Mr. P. W. Blandford's article on page 547, April 24th issue, with a table I have used very successfully for many years, I note some significant differences.

The differences are that the tapping holes in my table are a little bigger than 75 per cent. for the Whitworth and smaller than 75 per cent. in the B.A. range.

Apparently the author of the table I have been using made this variation to relieve the strain on small taps where the thread is deep, and the tap is thus more susceptible to breakage. With the B.A. thread form the taps are much stronger and the 75 per cent. figure allowed by Mr. Blandford has been found, in my experience, to be too generous.

Yours faithfully,
FREDERICK MASSEY.

CLUB ANNOUNCEMENTS

S.M.E.E. Affiliation

There will be a "track" meeting at Wanless Road, at 2.30 p.m., on June 28th, 1952. Two tracks will be available and members are invited to bring their locomotives and demonstrate their powers.

Hitchin and District Model Engineering Club

Through the kindness of our local council, we have just moved into new headquarters. This is a good brick building which all members have co-operated in renovating into a first-class club house. There is half an acre of land, and a river running by the side. Apart from these useful assets, there are the children's playing fields on one side and British Railways running along the bottom.

The multi-gauge passenger carrying track is now well under way and when completed, we look forward to visits from members of other clubs.

Hon. Secretary: E. KEITH, Heathfield Road, Hitchin, Herts.

Eltham and District Locomotive Society

The next meeting will be held at the Beehive Hotel, Eltham, on July 3rd, at 7.30 p.m., when, weather permitting, it is hoped that members will then proceed to the permanent track at Avery Hill Road, Eltham, and carry out several outstanding jobs, with a view to getting ready for the next club day, which will be held on July 12th.

At the last meeting Mr. May brought along his 3½-in. gauge tank locomotive and gave a talk on its construction. As this was his first effort in both directions, Mr. May made a very creditable job of both. Mr. Green also brought along the chassis of his 3½-in. gauge "Bantam Cock," and gave a short description to members. Mr. Calver, of Lewisham, attended as a visitor, and as he is the possessor of two locomotives, it is hoped that we may gain his valuable membership.

Visitors are always cordially invited to the meetings.

Hon. Secretary: F. BRADFORD, 19, South Park Crescent, S.E.6.

The Orpington Model Engineering Society

On Whit Monday the society gave a very gratifying exhibition of locomotive running at a local fete; the track was well patronised by the children, and none of the locomotives gave any trouble. The society's thanks are due to the noble band of helpers who turned up and willingly set about the hundred and one menial tasks connected with a run.

The society recently visited the Old Oak Common running sheds (sorry, the modern term is "Motive Power Depot") of British Railways, Western Region. The visitors were given the freedom of the depot, and were allowed to climb into any engine they wished. The society would like publicly to thank British Railways, and in particular, the motive power superintendent of Western Region for his helpful co-operation.

The society had a very good track run at the annual fete at Farnborough Hospital, and good weather helped in providing an enjoyable time for the kiddies. A surprising feature was the number of very old patients who patronised the railway; they were just as excited as the younger ones.

At one point in the proceedings, the members were asked by an agonised lady to see if they could rescue her pet dog, which had fallen into a deep disused pit with vertical sides. Model engineers are never baffled, and one of our acrobatic members, Mr. Peter Jordan, was held by his heels and lowered into the pit. Amidst the cheers of the onlookers, he raised the dog and was soon back at his job of track inspector

If any "lone hand" locomotive owner would like to give his engine a run on the society's track, he should give the hon. secretary a ring. The track is of steel, is 170 ft. long, and has 5-in., 3½-in. and 2½-in. gauges. It also has an "O" gauge, and a ¾-in. gauge, should anyone require these unusual sizes.

The visit to Hastings on July 13th is drawing near, and members are urged to put up a good show. No locomotives will be taken, but the power-boat men are expected to "do their stuff" and provide a show worth travelling to Hastings for. At the time of writing, it is a little uncertain whether a pole suitable for the heavies will be ready, but all straight-runners will be welcome. If any members of other clubs would like to come, and if they can get to Orpington by 9 a.m. on a Sunday, give the hon. secretary a ring to see if there are any vacant seats on the coach.

Hon. Secretary: HAYDN D. SMITH, 12, Gilroy Way, Orpington. Phone: ORP. 3938.

Bromley Miniature Power Boat Club

An open regatta will be held at Whitehall Recreation Ground, Southlands Road, Bromley, Kent, on Sunday, July 6th, commencing at 1.30 p.m. The events are as follows:

(1) Nomination race for free-running craft.
(2) Radio-control steering competition.
(3) Steering competition for free-running craft.
(4) Relay race for free-running craft.
(5) Radio-control balloon-bursting competition.

Hon. P.R.O.: P. L. PETCH, 200, Langley Way, West Wickham, Kent.

Spenborough Society of Model and Experimental Engineers

The above society continues to make good progress. Several excellent talks have been enjoyed in recent months, as have also several works visits. Two recent ones have been to a glass works and the locomotive works of British Railways at Doncaster where a very enjoyable Saturday afternoon was spent. Locomotives were seen in all stages of repair, including some of the Pacifics.

After several changes of meeting place in the club's short existence, we now hope to be able to settle down, facilities having been given to the society for the use of the hall in the South Parade Modern School by the Education Committee. These meetings are held on the second Monday of each month and any lone hand who cares to join us will be made welcome.

Hon. Secretary: S. BARRACLOUGH, 24 Shirly Road Gomersal.